...IT, JULY 1, 1937 FIRST AERO WEEKLY IN THE WORLD ... AS A NEWSPAPER
JUL 15 1937

FLIGHT

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The AIRCRAFT ENGINEER AND AIRSHIPS

R.A.F. AND S.B.A.C. DISPLAYS

HAWKER "HURRICANE"

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The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editor C. M. POULSEN

Managing Editor G. GEOFFREY SMITH

Chief Photographer JOHN YOXALL

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The King and His Air Force

ONE cannot help feeling certain that King George VI was very proud as he watched the eighteenth R.A.F. Display at Hendon on Saturday. Any man would naturally feel proud to remember that he had been an officer and a pilot in such a Force, and any King would feel proud to be the Chief of such a splendid fighting Service. The red, white and blue parachutes of the army co-operation squadron were of Coronation colours and paid a subtle compliment to the new King who that day first reviewed the Force which had become *his* Force. The great mass formation flight was another tribute to the same occasion. Two hundred and fifty aeroplanes are but a small proportion of the Air Force in this country, but they made the largest formation flight which had ever taken the air in one mass. They did not represent all the latest types of aircraft with which the Force is being equipped, for the only twin-engined low-wing monoplanes in the formation were reconnaissance aircraft, and the fighters and bombers which were seen were all biplanes. Yet even so, that mass told a tale of power, and still more of organisation and staff capacity.

It was no small matter to collect all those twenty-five squadrons from different aerodromes, assemble them in columns, and then join up the five columns. The staff work was excellent, but the weather, which was bad in the North Midlands, did its best to spoil the efforts of the staff. Weather delayed one of the columns and made it four minutes late at the rendezvous. As the other columns, which were up to time, could not halt and mark time in the air the original arrangement was to some extent dislocated, and that accounted for some looseness in the formation flying of the rear part of the mass, and for the absence of the Harrows. None the less, it made a great and imposing spectacle.

Taking the Display as a whole the impression is left that all the actors did well, but the stage management varied between very good and not so good. The aerobatics, both individual and flight, were as excellent as usual. The item of instructor and pupil was an improvement on previous versions of this event. The patterns made by the smoke machines were more gracefully designed and executed than ever before. The low-flying attack by No. 25 (Fighter) Squadron was a masterpiece of rapid motion. The set piece was, like the same event last year, instructive by means of well-conceived broadcasting and because it showed formations of new types in the air.

Against these merits it must be said that too much time was spent on a few events which would have been interesting if they had been short but became the reverse when they went on too long. For quite a while we all thought that the kite balloon must be inflated with helium; and low bombing begins to pall when nine flights have all to make so many runs apiece. But, all in all, it was a good Display, and once more it was free from any mishap.

Two Days for Hatfield

THE exhibition and flying display arranged each year by the Society of British Aircraft Constructors has been growing in popularity ever since it was instituted. It is really a great industrial fair where customers can see all the best that the British aircraft industry can produce. Prospective buyers naturally want to see aircraft in the air, but they also want plenty of time to examine machines and engines on the ground; and the tale of wants is not bounded by a long way by complete airframes and engines. There are enormous possibilities of business in the multitudinous accessories which the modern aeroplane, civil or military, requires. That section of the exhibition is always very popular with visitors on business intent.

This year a most welcome innovation has been made in extending the exhibition and display from one day to two. Previously only one day was given to it, of which the morning was taken up with flying while the

afternoon was of a static character. Then the lunch and the speeches, both very desirable, took up a certain amount of time, and some complaints were expressed that prospective buyers were not given enough time for a careful and minute examination of all the accessories. This year there should be no complaints on that score, for the whole of the first day was allowed for careful scrutiny, while all the flying took place on the second. To make the S.B.A.C. Display still more attractive next year, it might be thrown open to the general public for the rest of the week.

Westward and Southward Ho!

FEELINGS were poignant at the Imperial Airways' lunch at Southampton on Tuesday that the chairman of the company had not lived to see the inauguration of the Empire air mail scheme up to the terminus at Durban, which was due to be started that day. But though the great leader is gone his work remains, and Imperial Airways, despite occasional setbacks, flies on determinedly towards its goal. Tuesday's ceremony marked a notable step forward, for henceforth all letters for places in British Africa down to Durban will go by air as a matter of course. The writers of the letters will not be consulted on the subject; the aeroplane is now accepted by the Post Offices of the Empire as the normal way of sending mails through to their destination. This now accomplished fact turns our thoughts back to the old days of Air Conferences in the Guildhall when the representative of the G.P.O. invariably said: "We are sympathetic, but we demand regularity. When your aeroplanes can fly without frequent forced landings from engine trouble, we will consider sending all our mails by air." Now the forced landing is an exceptional event, and the G.P.O. is willing to expend up to £200,000 per annum for the advantage of using the speed and reliability of the aeroplane.

Talking of set-backs, it is rather surprising that the latest one should come from America. It was arranged long ago that the first trial commercial flights across the Atlantic should be made simultaneously by Imperial Airways and Pan-American Airways, the former starting from Ireland and the latter from the United States. In some American papers sarcastic remarks have been published that Pan-American Airways were ready to start, but had to wait until Imperial Airways were ready. Then the date June 24 was fixed for the two inaugural flights, and now comes the news that Pan-American Airways have demanded a postponement to July 5. It is disappointing but not serious. The simultaneous flights will take place in due course, and of their technical success no doubts are felt.

AT THE CORONATION-YEAR DISPLAY: The Royal party keenly interested in last Saturday's R.A.F. Display. Left to right are H.R.H. the Duke of Gloucester, Lt.-Col. Muirhead (Under-Secretary of State for Air), Her Majesty the Queen, Lord Swinton (Secretary of State for Air), His Majesty the King, Marshal of the Royal Air Force Sir Edward Ellington (Chief of Air Staff) and H.R.H. the Duchess of Kent. The Duke and Duchess of Kent arrived by air.

The Outlook

A Running Commentary on Air Topics

Aircraft at Bilbao

THE so-called Iron Ring of fortifications round Bilbao did not keep that gallant city safe from the besieging forces of General Franco. One wonders whether that ring really deserved the epithet bestowed upon it by the defenders. There is no means of saying whether it would have been approved by acknowledged authorities on modern fortification. At any rate, according to the published reports, it was broken by combined shelling by artillery and bombing by aircraft. It is generally recognised that gunfire is more accurate and destructive than aerial bombing, and when the guns are within range of a position they ought to be able to deal with it without requiring help of that sort from the air. For directing guns on to a target, aircraft are, of course, invaluable and well-nigh indispensable. Bombers, however, can deal with the back areas and hamper the movement of reinforcements up to the front. That is a very proper function of bomber aircraft, and Franco's bombers certainly seem to have played their part in breaking down the resistance of the Basque army.

As against that, the bombers are also alleged to have done much destruction in the city itself, and to have killed numbers of the civil population. There is no indication whatever in the reports that this slaughter of civilians contributed in any way to the surrender of the city, any more than similar action had any effect in causing Madrid to fall. In fact, the Spanish civil war seems to have given repeated proofs that air bombing of civilians is futile and contributes nothing to victory, whereas the proper use of aircraft against armed forces has been distinctly effective. The moral is plain.

Understanding

APART from the excellent work which the *Fédération Aeronautique Internationale* is doing in furthering the interests of flying people throughout the world, the opportunities given to members of the different aero clubs represented to come to know one another is of inestimable benefit in bringing about a better appreciation of the varied problems and points of view. This year it is the good fortune of Great Britain to be the meeting place of the F.A.I. Conference, and amidst the hard work of conferences and discussions the social side is not being overlooked.

The spirit in which the delegates and their hosts meet can be illustrated by a single example, the luncheon given by the Royal Aero Club to delegates and their ladies at the Savoy last Thursday. There were no speeches, but the luncheon was a thoroughly enjoyable affair and did much to cement old friendships and make new ones.

Inevitably the language difficulty must arise on these occasions, but it was heartening to hear how it was overcome and, in the end, proved to bring people together rather than keep them apart. An excellent example of this was provided by two married couples, one English and the other French. The Englishwoman spoke little or no French and the Frenchwoman no English. Monsieur the Frenchman did his level best in English, and a very good best it was. Madame listened for a little while, and then, with typical French wit, asked a friend to tell the Englishwoman that if she listened carefully to Monsieur's English she would learn quite a bit of French! Monsieur took it all in good part, although his wife's remark was a little unkind to his English, which was actually far better than the average Englishman's attempts at speaking French.

While the suggestion to introduce English as the second official language of the F.A.I. must be welcomed, it is to be hoped that no attempt will be made to use this as an excuse for Great Britain's representatives at social affairs to drop all efforts at mastering other languages.

Camouflage

THE ARMY, we read, is commendably busy in studying the art of camouflaging its guns, tanks, and other impedimenta. Some traces of the camouflage used so extensively during the Great War have survived nineteen years of neglect, and still adorn Government buildings, notably those of the R.A.F. Equipment Depot at Kidbrooke, near Blackheath, which are familiar to passengers by the North Kent line of the Southern Railway. One wonders idly as one passes how they would look from the air even if the paint were freshened up. Would the curving lines of green and brown really merge into the surrounding landscape? During the Great War the camouflage artists did the best they could, but there was not always time and opportunity for the effect to be studied and criticised from the air. Now, in the more leisurely times of peace great attention is given to this matter of effect from the air, and the result will probably be much better.

Still, it must be remembered that the aircraft has still one effective answer to even the most cunning and realistic scheme of camouflage, though it may not be always possible to use it in time of haste, or for mobile subjects such as a tank. Stereoscopic photography, though not so simple as the straightforward variety, will refuse to be misled by the arts of the painter. It draws the subject up out of the flat plane in which the artist has tried to hide it, and exposes its shape, as it were naked, to the eye of the hostile bomber or gunner.

Pursuing the subject even further, it may be that the photographic chemist will be able to speed up infra-red emulsion to such a point that it can be used for everyday military photography. Then, in addition to stereoscopic relief, the natural and artificial greens will be separated; for while all living matter reflects infra-red rays strongly, artificial colours do not do so. In the photograph the real grass will appear whitish, while the green paint will be seen as a dark grey.

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THE ROYAL AIR FORCE DISPLAY

Record Crowd Watches One of the Greatest Spectacles of Coronation Year : The Events Described in Detail

Illustrated with "Flight" photographs

ONE more Royal Air Force Display—the eighteenth—has come and gone. One more brilliant pageant of crowds, and cars, and chairs, and white-painted railings, marquees and flags, of lovely women in frocks that would look theatrical in any setting other than this or Ascot; of their escorts, tanned Royal Air Force officers, or others, some civilian-attired but with Navy or Army stamped unmistakably in their bearing; of sudden, surprising splashes of dazzling Oriental costume that remind us of the added importance which Coronation year has bestowed upon the occasion.

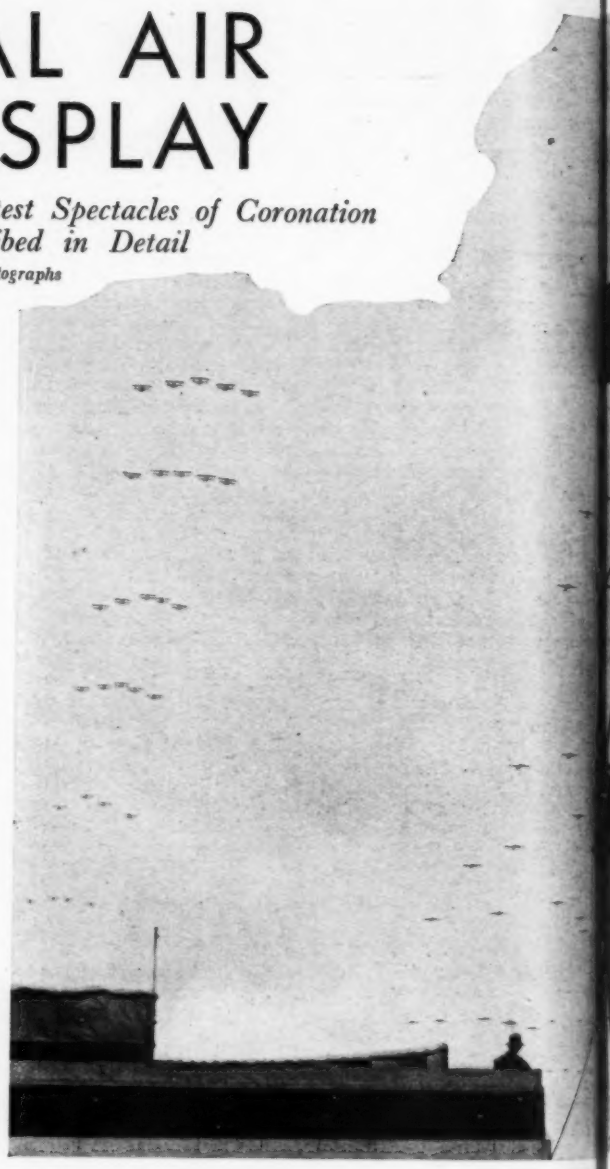
And in contrast to this kaleidoscopic horseshoe of humanity is the sweeping green arena of grass which it embraces—an arena lined on its far side with aeroplanes shimmering silver in the heat of a scarcely veiled midsummer sun, and fringed here and there with fire tenders, duty cars, control posts and those other few visible signs of the vast and intricate organisation which lies behind Hendon's great annual event.

Then, lastly, and most important of all, the real stage—the sky. And here, whatever the item in progress, the predominant feature is sound: the pulsating diapason of a squadron of day bombers; the shattering scream and crackle which a fighter's exhaust and metal airscrew combine to throw out as it streaks low in front of the enclosures; the airy rat-tat-tat of machine guns; the solid thud of bombs—sounds that, in their true settings, strike fear into the hearts of men, but which here play only the part of a theatre orchestra, giving zest and gaiety to the spectacle.

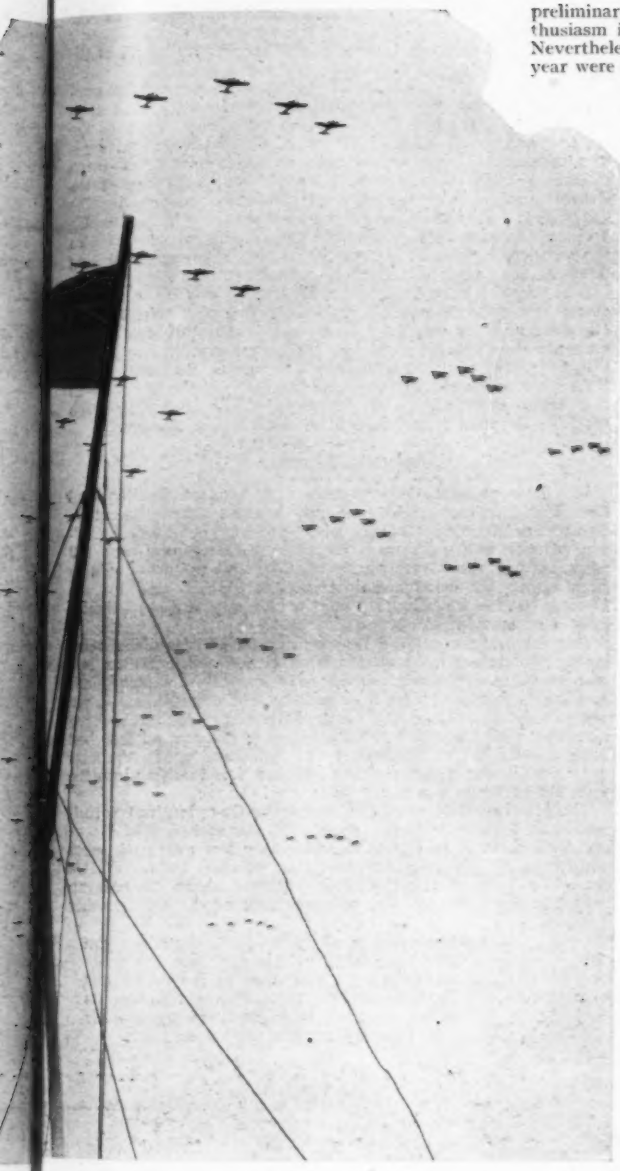
* * *

As usual, the programme was divided into preliminary and main events, the latter beginning at 3 p.m. after the arrival of Their Majesties the King and Queen. Incidentally, Their Royal Highnesses the Duke and Duchess of Kent arrived by air from Northholt in Sir Philip Sassoon's D.H. Dragonfly.

The Headquarters Race, that hardy annual which opens the



This panorama gives some indication of the vast size of the crowd (some 195,000) and of the packed car parks. In the photograph above are seen the aircraft which took part in the outstanding event, the fly-past.



preliminary events, can hardly be expected to arouse much public enthusiasm in view of the far more spectacular events which are to follow. Nevertheless, it is a genuine and hard-fought contest. The competitors this year were two officers from the Air Ministry and two from each of the four Home Commands, making ten starters in all, and the variety of aircraft was most marked, ranging from a Walrus amphibian (the limit machine) to a Blenheim, which started from scratch some thirteen minutes afterwards.

Decided over two laps of a 44-mile "square" course, the affair resulted in victory for the Air Ministry, as represented by Wing Cdr. D. V. Carnegie, A.F.C., flying a Hart (Kestrel), and giving the limit man about 7m. 15s. start. Wing Cdr. Carnegie, whose average speed was 164 m.p.h., was hotly chased over the finishing line by a Fury II (Kestrel), flown by Wing Cdr. C. A. Stevens, M.C. (Fighter Command), and Wing Cdr. J. W. Baker, M.C., D.F.C., was a fair third in an Audax.

The next event provided a sharp contrast. There is an inevitable limit to the variety which can be introduced into a plain aerobatic programme, unless, as in the case of many Continental exhibitions, the pilot concerned is prepared to take considerable risks in such performances as ground level inverted flying. P/O C. B. Hull's show with a Fury from No. 43 (F) Squadron was polished and spectacular within the reasonable height limits imposed.

We had seen it all before, but, as in the case of a number of other familiar items, this was better than ever; to the initiated, too, the continuous and harmonious variety of evolutions was spectacular in the true sense. From the moment when he started his initial dive through the lower cloud layers, P/O Hull always placed his machine and organised the sequence of his aerobatics so that there was no pause in interest. No one will ever tire of vertical upward rolls or even of the plain high-speed steep turn with which the display terminated. Exhibition pilots do not always realise that an impression of speed (with noise) is more exciting to the general public than any number of beautifully executed slow rolls at a safe height.

Spot Landings

Quite one of the most interesting of events from the knowledgeable spectator's point of view, a landing competition, is also educative to the public, since it shows that an aeroplane in the hands of a reasonably experienced pilot is not necessarily dependent on the engine for its ultimate safety. If the machine in this case could have been brought in with dead sticks the effect would have been even better, but on such occasions allowances must always be made for even remotely possible errors of judgment—an undershot approach at Hendon would indeed be calamitous.

The programme explained that the machines used by the ten finalists in the competition would be Hart Trainers; in fact, there were Demons and "Audaces" also to be seen. However, their characteristics are much the same and it was interesting to notice how each pilot's approach technique was virtually identical and did not involve the use of more than a very gentle sideslip at the most. Unfortunately for the pilots there was practically no wind and however slowly the machines appeared to be brought over the tape the pre-landing float was mildly pronounced. Although we could not see the exact position of the "touch-down" disc, it seemed that its distance from the tape, however, was such that an over-slow approach was neither necessary not advisable. In the matter of plain technique, the approach made by the last pilot (Flt. Lt. P. C. Lawrence) was undoubtedly the best, and it later transpired

that his landing was nearest to the disc. He is attached to No. 1 School of Technical Training.

Next, half a dozen Gauntlets (Mercury) of No. 56 (F.) Squadron showed how, had their twin Vickers guns been fed by S.A.A. instead of blanks, they would have made a first-rate cullender from a sleeve target, towed by a Gordon (Panther) of No. 3 Armament Training Camp. They reminded one of a litter of playful puppies worrying some strange new discovery. This event demonstrated very forcibly how useful training in flight aerobatics can be. The methods of attack illustrated would be of use only against heavy aircraft flying a steady course. Approaches from above, behind and below the target were demonstrated.

Preliminary event No. 5 made it obvious to everybody who had studied refuelling demonstrations at previous Hendon Displays that enormous strides have been made in the technique during the past twelve months. There is now no hit-and-miss angling for the line that pulls the pipe across from tanker to tankee. On Saturday, a Vickers B/19/27 bomber (two Pegasus)—an unfamiliar type to most people—refuelled an Overstand (two Pegasus). The modern procedure, in brief, is as follows: the receiver trails about 150ft. of cord terminating in a small grapnel, and the tanker lowers about 80ft. of cable, with a grapnel and a weight that causes it to hang nearly vertically. The tanker then crosses over above the receiver, the lines cross and the weighted grapnel catches the trailing cord.

The tanker operator next lets out the refuelling pipe, with the coupling line attached, and the final operation of pulling the pipe across to the receiver is an interesting one—a small parachute or drogue is released, and, blowing back in the slipstream, pulls the coupling line over a pulley until the fuel pipe is brought on board—a process taking only a few seconds and dispensing with troublesome winches or delicate formation work.

Fuel is pumped across at 80 gallons per minute. An automatic coupling allows the pipe to disconnect should the aircraft break apart, the fuel being automatically cut off, but the pull of the drogue on its line will immediately restore the union as the machines come together again.

A good deal of keen rivalry in the eliminating heats of the dive-bombing competition preceded the final, "dived off" on Saturday. This was, to all intents and purposes, a completely novel event, and combined spectacle with that competitive interest which is always so welcome. Each of the Home Commands—Bomber, Fighter, Coastal and Training—was represented, all competitors using two-seater Hawkers (Kestrel) (and so being quite evenly matched) except the Coastal challenger, who flew a big Vildebeest torpedo bomber (Pegasus). It was enlightening to note how slow the big Vickers was in gathering speed in the dive in comparison with the smaller, faster and cleaner Hawkers, which came whining down at the target in the best "hell-dive" style.

A Hind pilot from the Bomber Command was eventually declared triumphant, scoring 165 points out of a possible 200. His average error was 8.75 yards, which gives an idea of how accurate dive bombing can be. In actual practice, of course, the approach would be deliberately erratic to confuse the "Archie" gunners, but the final "step" of the dive is well and truly directed. The bombs used on Saturday—each machine dropped four—were filled with liquid stannic.

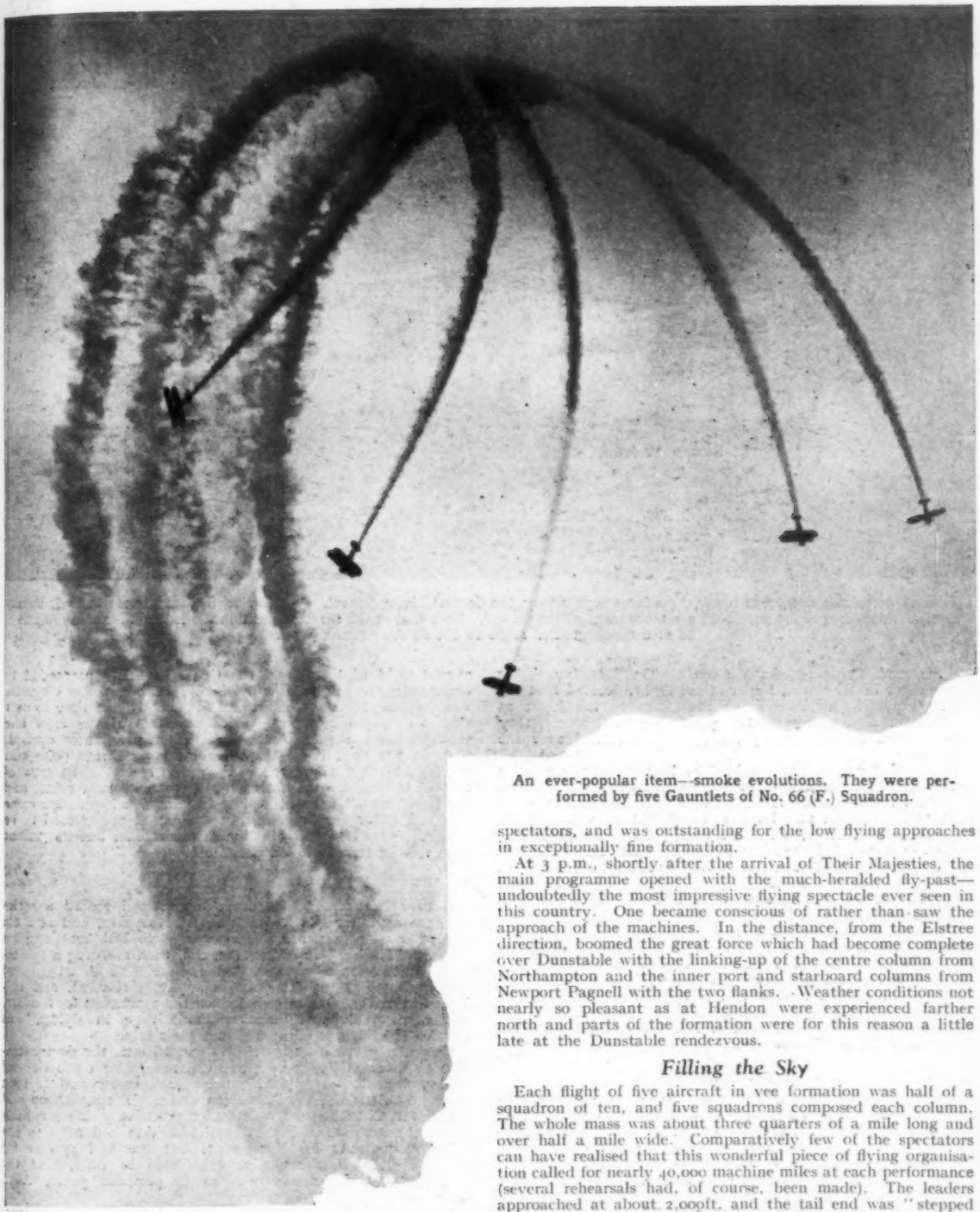
Aerobatic Overstrand

For the next item, the evergreen 101 Squadron Boulton Paul Overstrand was matched this year against three Kestrel V. Demons of No. 604 (County of Middlesex) (Fighter) Squadron, Auxiliary Air Force. Sergeant W. Cockburn took full advantage of the Overstrand's docility and agility—profiting from either virtue as circumstances demanded—and led the Demons a dance such as would make any ordinary fighter pilot shed tears of blood.

In their first assault the Demons approached from the stern, laying themselves open to fire from either of the B.P.'s two rear guns. One of their number was immediately picked off, and his companions closed in with added doggedness. Then came those marvellous stall-turns, half rolls and loops and the sickening stall for which the multitude of Overstrand fans had been waiting, till at last one tenacious Demon got in the fatal burst which sent this proudest of all bombers lurching into the Valhalla of Overstrands Mill Hill way.

The Hawker Hectors of No. 13 (Army-Co-operation) Squadron, with Napier Dagger engines, held the attention of everybody when, in close formation, they flew low overhead, wires whistling, to drop messages. Immediately following this three members of the Squadron swooped down to pick up replies to the messages, but only one succeeded. Of the other

The Hectors of No. 13 (A.C.) Squadron seen above the D. H. Albatross, whose size easily dominated the machines in the "New and Experimental" park. This 91, to use its series number, is to be used by the Air Ministry for Atlantic experiments.



An ever-popular item—smoke evolutions. They were performed by five Gauntlets of No. 66 (F.) Squadron.

two (who were possibly worried by bumps and a tricky light), one missed the string, the other hooked up poles, string and all, then dropped them again. The remaining six picked up four messages in close formation; the two apparently unsuccessful ones may have been lucky, but no puff of white smoke registered success.

After collecting his flock again, Sqn.-Ldr. S. H. C. Gray lead a close formation over and dropped supplies by red, white and blue parachutes. A squadron of twelve Hectors, incidentally, can drop about one ton of supplies per journey.

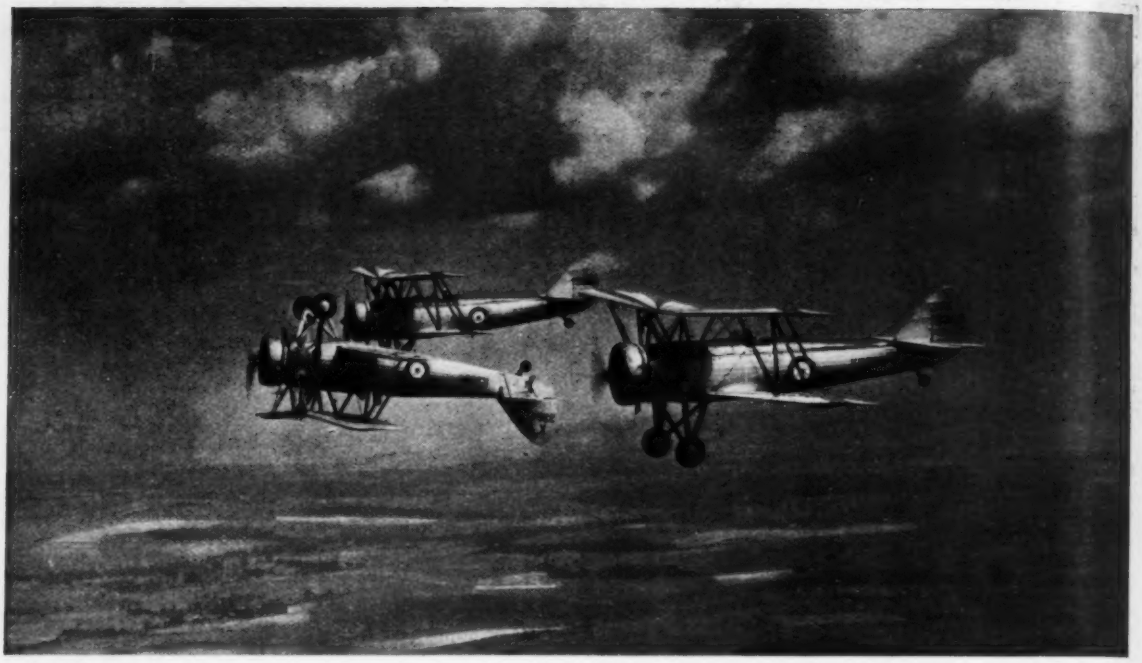
This was definitely one of the most popular events with the spectators, and was outstanding for the low flying approaches in exceptionally fine formation.

At 3 p.m., shortly after the arrival of Their Majesties, the main programme opened with the much-heralded fly-past—undoubtedly the most impressive flying spectacle ever seen in this country. One became conscious of rather than saw the approach of the machines. In the distance, from the Elstree direction, boomed the great force which had become complete over Dunstable with the linking-up of the centre column from Northampton and the inner port and starboard columns from Newport Pagnell with the two flanks. Weather conditions not nearly so pleasant as at Hendon were experienced farther north and parts of the formation were for this reason a little late at the Dunstable rendezvous.

Filling the Sky

Each flight of five aircraft in vee formation was half of a squadron of ten, and five squadrons composed each column. The whole mass was about three quarters of a mile long and over half a mile wide. Comparatively few of the spectators can have realised that this wonderful piece of flying organisation called for nearly 40,000 machine miles at each performance (several rehearsals had, of course, been made). The leaders approached at about 2,000ft. and the tail end was "stepped down to 1,350ft. When the five columns commenced to break formation—the manœuvre could be plainly seen from the aerodrome—their flying speed of 130 m.p.h. had already carried them over Hyde Park.

The actual types were quite easily picked out. In front, in the middle column, were the general reconnaissance Avro Ansons (two Armstrong Siddeley Cheetah engines) of No. 224 (G.B.) Squadron. On each side of the Ansons were the Kestrel-engined Hawker Hinds, and outside these were the Gloster Gauntlets (Mercuries). In the "dress rehearsal" on Friday the tail end flights kept better formation and ten Handley Page Harrows with two Bristol Pegasus engines each, brought



Tens of thousands saw from below these three Tutors from the Central Flying School. In this view of them, taken at their own level, the attitudes of the machines are more clearly brought out. Note that in the inverted position the leader's machine has to be at a much greater angle to obtain the necessary lift.

up the rear, flying at about 2,500ft. On Saturday, Wing Commander L. H. Slater, leader of the flight, decided that the Harrow bombers broke up the symmetry of the flight as a whole and after communication with the ground control they were ordered to break away shortly before arrival over the aerodrome.

Light relief was swiftly provided by that immensely popular event the instructor and pupil act—carried out with the help of radio telephony and one Peabody, who, before he has learnt even to fly straight and level, is being tested on aerobatics. The instructor (Flt. Lt. G. A. Bartlett) intoned the customary patter, demonstrated the manœuvres and religiously took over again from the pupil (Flt. Lt. J. W. Donaldson) after each of his attempts, while the latter fought for mastery with controls, horizons and internal derangements and explained his difficulties and impressions in a series of squeaks.

Peabody, of course, fell out of the top of his loop; made two abortive attempts at a slow roll—the second culminating in the flickest of flick rolls (stick in stomach and full rudder)—wobbled to an uncertain vertical standstill in a stall turn and spun off it; made a terrifically fast approach; and then held off with great violence to shoot up into the sky again until the Hart Trainer was all but stalled, and the instructor bawled that "he'd got her" once again.

Anti-climax

Finally, having turned the pupil down in no uncertain terms, the instructor demonstrated the perfect approach, held the Hart off a little on the low side ("This will be a real three-pointer"), made a wheeler with plenty of flying speed and yanked the stick back to simulate the world's greatest bounce. Silence, save for the delighted squeaks of that idiot Peabody. A crushing anti-climax.

As pretty as ever were the smoke evolutions, performed by five Gauntlets (Mercuries) of No. 66 (F.) Squadron—Flt. Lt. R. E. de T. Vintras, P/O.s R. E. Lovett, L. R. Helps, K. McL. Gillies and Sergt. A. C. Brunner. The green, orange and white vapour dispersed rather quickly in the heated and disturbed air, but the designs traced were recognisable enough. They included a familiar old evolution now appearing under a new name—"the aspidistra" (in which, according to the announcer, "all five break away in pairs"), and a very praiseworthy Royal Cipher—the Crown and "G.R."

It was rather like old times when two Virginias flew pompously overhead at a very low altitude. Their dignity was rather upset when a flight of No. 54 (Fighter) Squadron caught sight of them, and the three Gauntlets proceeded to make themselves as rude as possible. Soon one of the Virginias was belching forth red and white smoke. It was time to quit ship, and out bundled the eight members of the crew like sausages from a patent machine. Their parachutes opened, and, though their bodies looked a bit invertebrate (who said sandbags?) they all reached the ground safely. The crew of the other Virginia was not so lucky when its turn came, and the last "man" delayed pulling his ring too long. He came to earth with a sandy crash, but the ambulance refused to be thrilled. One Gauntlet also burst into smoke, but its gallant pilot refused to take to his parachute.

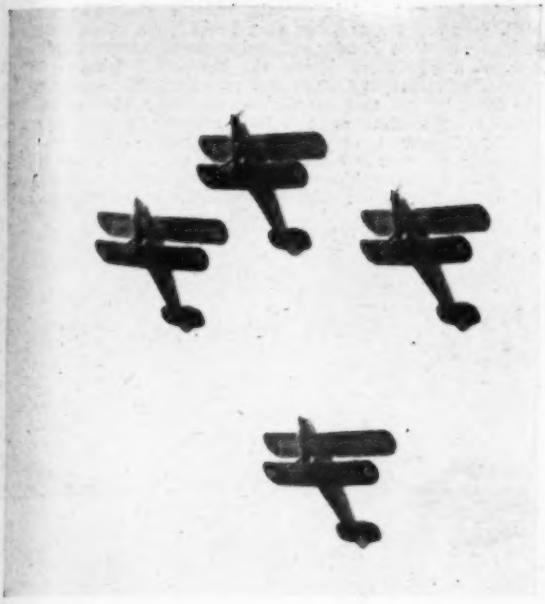
Out of the Past

More comic relief! Up from the ground soared a series of monsters alleged to frequent the stratosphere, and at them dashed a wierdly painted Monospar (two Pobjoys) and an ancient "Horice" Farman (Renault), each carrying a sportsman armed with a double-barrel 12-bore. Bang, bang! and each monster in turn writhed in agony, shrivelled, and collapsed to earth. One or two dodged the sportsmen for a while, and some took an "unconscionable time in dying," as Charles II said, but all at last met their fate.

Carefully planned and perfectly carried out, the demonstration of inverted flying by three instructors from the Central Flying School was appreciated by connoisseur and layman alike. Flt. Lts. H. W. Mermagen and G. D. Stephenson and Flt. Sergt. C. Scragg demonstrated a precision which was little short of marvellous. The original intention had been to use Miles monoplanes for this event, but the fuel system for inverted flying could not be completed in time, and the machines actually used were, as in previous years, Avro Tutors with Siddeley Lynx engines.

Coming in over the enclosures in flight formation and crossing the aerodrome, the machines half-looped into the inverted position and proceeded to circle the aerodrome, afterwards changing into line-astern and doing rolls. After changing to flight formation again the leader inverted while the other two remained right way up. The leader then half-rolled into the upright position and the flight did a half-roll into the inverted position once more. Height and distance from enclosures were just right for the event to be watched with that intimacy which is necessary for a full appreciation of the finer points. Station-keeping was excellent throughout.

Event No. 7 reminded one that, unlike the Americans, we do not equip squadrons solely for "attack" or ground-strafing



Something new in flight aerobatics : Four Furies carry out combined aerobatics and formation changes. In this view the machines are seen in the basic diamond formation.

work. Our light bomber units, however, are trained in the art of making high-speed assaults on ground targets from low altitudes which may profit them when surprise is desirable or if the cloud base is low.

A low bombing attack was demonstrated this year by three squadrons of Hawker Hinds (Kestrel)—Nos. 12, 49 and 142—using harmless but satisfactorily noisy *papier mâché* bombs. The targets were screens which were approached by the Hinds from various directions and with varying success.

In war-time light fragmentation bombs would be favoured for this work.

Flight Aerobatics

The use of radio telephony between air and ground in recent Displays has added a great deal to the interest and educative value of certain events, and it is certainly exciting for the public to realise that they are actually listening to the pilots' own voices. Last year the flight aerobatics event was carried out with three Gauntlets which were tied together and the telephony idea was used for the first time; this year four "free" Furies, forming a square or diamond, demonstrated advanced formation flying and, if there *had* been connecting cords, these would only have been broken when the flight changed formation.

Once again it can be said that the demonstration, though not providing anything very new, was superbly carried out. Even when the machines changed formation there was not a trace of jerk, and the spectators only realised that the change had been made when the combined manœuvre had been completed. The show was wound up with a pretty formation landing, made necessarily in unsymmetrical Vee formation. Led by Flt. Lt. E. M. Donaldson, the pilots were: F/O. H. E. C. Boxer, P/O. P. F. Walker and P/O. P. P. Hanks.

A hardy annual, so spectacular that it never palls, is the destruction of the kite balloon, and this year it was given a novel twist by the employment of genuine 1914-1918 aircraft as attackers and defenders. What memories must the Bristol Fighter, S.E.5a and Sopwith Triplane have aroused in the war-time pilots present as they taxied out past the enclosures, the Sopwith's engine stuttering on that characteristic flat note and loading the warm, still air with castor-oil smoke!

Taking off, the trio proceeded to harry the balloon. Their manœuvrability—largely due, of course, to the low speeds—was most marked, but the very highest marks must go to their anonymous pilots and to those who were responsible for their airworthiness.

Twenty Years After

But the real surprise came when the balloon's defender appeared—an apparently genuine L.V.G. biplane, dazzle-painted in the correct manner, and tactfully referred to in an announcement as "a type widely employed during the war by several countries."

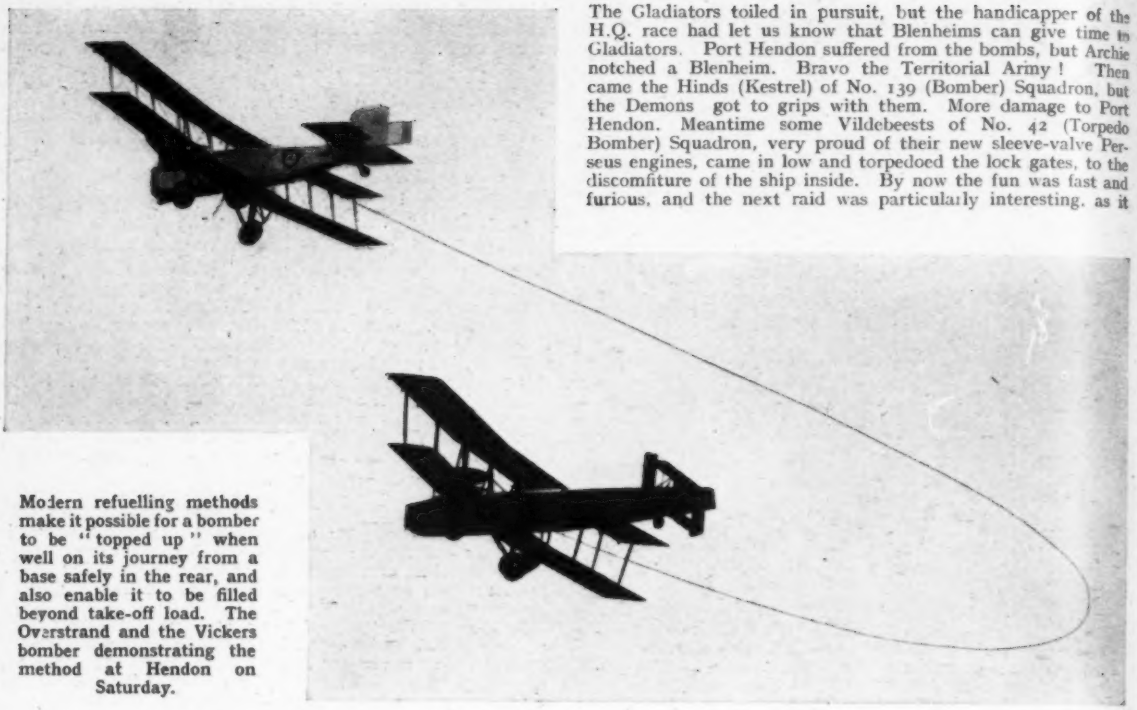
In the duel the "tripe" was shot down, then the S.E.5a, and the L.V.G. and the "Brisfit" fought out an inconclusive combat while the remains of the balloon, belching great clouds of orange flame, slid swiftly earthward, its "observer" escaping by parachute—all of which again seemed a very fair and tactful arrangement.

For Event 10 it was supposed that a band of pirates had raided a river steamer and were returning home with the loot. The appearance over the brow of the flying field of a motley collection of villains in suitable attire caused quite a lot of amusement, particularly among those onlookers with field-glasses.

The punishing Hawker Furies of No. 25 (F) Squadron made a spectacular dive attack on the pirates, who proceeded rather obviously to throw bombs at themselves. The scream of the Kestrels would be most terrifying to such uncivilised ruffians, and the undulating circle of Furies, continuously diving from different directions, would have been very bewildering and demoralising. One moment the fighters would dive in flights of three looping over at the top ready for the next dive, the next minute, without warning, they would all dive in line, pulling out almost on the ground and zooming up and out of range again.

The pirates certainly received a severe and lasting lesson. More than challenging Tattersalls with its parade of

"A New and Experimental" that puzzled many visitors until they referred to their programmes was the Airspeed Queen Wasp, a wireless-controlled target machine. It looks much too comfortable and private-ownerish to shoot down into the sea!



Modern refuelling methods make it possible for a bomber to be "topped up" when well on its journey from a base safely in the rear, and also enable it to be filled beyond take-off load. The Overstrand and the Vickers bomber demonstrating the method at Hendon on Saturday.

lovely ladies and the technical brains of the world with its superb aeroplanes, the park of new and experimental types, which may be circumnavigated but not entered on the great day, was an immense success socially and satisfactory technically. The inmates, occupants or parkees will be treated hereafter in the order in which they taxied out to fly past.

And after the new types, an old favourite—the Set Piece. This year it was more theatrical than usual, and well staged. The erection represented Port Hendon, complete with lighthouse and a ship in dock. The broadcast came from the control room of the Fighter Command, and one heard the reports coming in of a Blueland raid flying inland very fast and evidently making for Port Hendon. The A.O.C. ordered up No. 3 (Fighter) Squadron to meet it, and we saw the Gladiators (Mercury engines) leap into the sky and make off for their patrol line. Then came in reports of a second raid, and yet a third. After waiting a moment to make sure of its direction, the A.O.C. sent up No. 601 (County of London) (Fighter) Squadron to deal with it, and off went the Auxiliaries in their Demons (Kestrels).

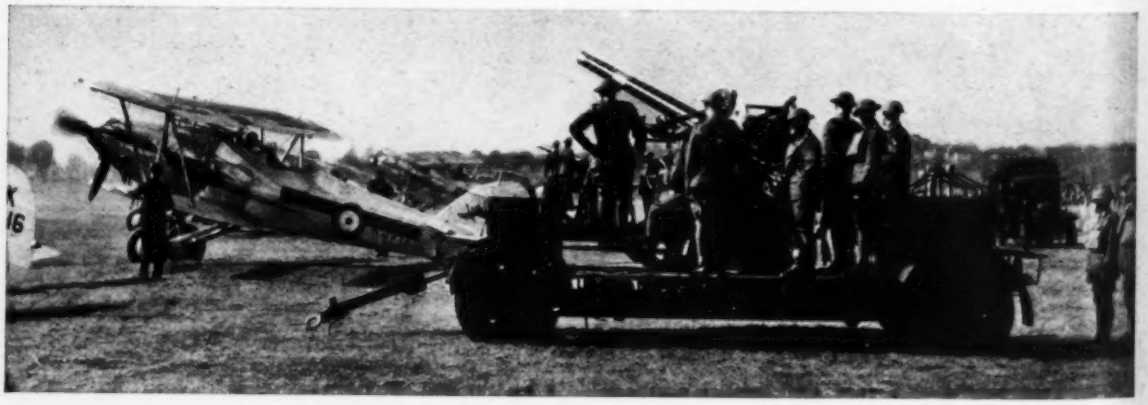
A pause, and then Archie began to bark, and over swept the Blenheims (Mercury engines) of No. 114 (Bomber) Squadron. The Gladiators toiled in pursuit, but the handicapper of the H.Q. race had let us know that Blenheims can give time to Gladiators. Port Hendon suffered from the bombs, but Archie notched a Blenheim. Bravo the Territorial Army! Then came the Hinds (Kestrel) of No. 139 (Bomber) Squadron, but the Demons got to grips with them. More damage to Port Hendon. Meantime some Vildebeests of No. 42 (Torpedo Bomber) Squadron, very proud of their new sleeve-valve Perseus engines, came in low and torpedoed the lock gates, to the discomfiture of the ship inside. By now the fun was fast and furious, and the next raid was particularly interesting, as it consisted of five Wellesleys (Pegasus) from No. 76 (Bomber) Squadron and five Whitleys (each two Tiger engines) from No. 10 (Bomber) Squadron. The Wellesleys thus appeared in formation in public for the first time, and very shapely they looked. The Whitleys were impressive. When they had finished, Port Hendon was a sorry mess, but everyone was tremendously cheered to hear that our own bombers had just demolished the chief aero engine factory of Blueland. "That," remarked the A.O.C., "will keep them quiet for a while." The reflection did not seem to console the O.C. Port Hendon, but it did rub it in that after all British bombers are our defenders. So ended, the war and literally in a blaze, the eighteenth Royal Air Force Display.

* * *

"New and Experimental"

Details of the machines in the experimental park are as follows, the order, as explained above, being that in which they taxied out and flew past.

The *De Havilland Don*, a new advanced trainer adopted by the Air Ministry, is fitted with a D.H. Gipsyking I inverted vee-twelve air-cooled engine rated at 430 h.p. at 8,000ft. The



"Archie" added to the fun with blank ammunition. In this picture he is seen with some Hawker Demons in the background.

cabin has side-by-side seating for instructor and pupil and provision is made for blind flying, bombing and gunnery, the latter from an Armstrong Whitworth turret. The machine is plywood covered. Photographs appear on page 18b.

Dimensions are: Span 47ft. 6in., length 36ft. 10in. and height 9ft. 5½in., and the estimated maximum and cruising speeds are 223 m.p.h. at 8,000ft. and 190 m.p.h. at 10,000ft., with a D.H. constant-speed airscrew.

The *Phillips and Powis trainer* is a private venture based on the same specification as the Don—T.6/34—and bears the Miles type number M.9. The stated top speed of 295 m.p.h. could well be believed during the fly-past. A stalling speed of 70 m.p.h. is claimed. No armament was fitted. Photographs appear on page 18b.

The *Airspeed Oxford* is an advanced twin-engined trainer derived from the Envoy. Facilities for practice in bombing, gunnery and navigation are provided and dual controls are fitted. A sectioned drawing of this machine appears on pages 26 and 27 of this issue.

Data are: Span 53ft., length 34ft. 3in., height 9ft. 9in., top speed 195 m.p.h. at 8,000ft. and cruising speed 170 m.p.h. at 10,000ft.

The engines of the production Oxfords will be the new Siddeley Cheetah Xs—developed from the Series IX now in service in the Anson, but equipped to drive variable-pitch airscrews.

The *Airspeed Queen Wasp* is a cabin biplane intended for use as a wireless-controlled target for gunnery practice. A Cheetah IX engine is fitted and the wings have a very pronounced taper. Provision is made for catapulting and for rapid changing from land undercarriage to floats. Obviously the Queen Wasp is quite fast. Dimensions are: Span 31ft., length 26ft. 4in. (29ft. as seaplane) and height 8ft. 9in. (10ft. 8in. as seaplane).

The *Fairey P.4/34* (Merlin) is comparatively well known. A feature of this machine's short demonstration was a dive and fly-past at very low altitude and high speed. Dimensions are: Span 47ft. 4½in., length 39ft. 11⅝in. and height 12ft. 9⅝in.

Built to the same specification as the Fairey, the *Hawker Henley* (Merlin) has been adopted by the R.A.F. Bombs are stowed in the fuselage "belly" (the Fairey's projectile load seems to be carried externally), and a very neat cockpit enclosure is incorporated. The rear portion of this may be only a temporary structure.

Dimensions are: Span 47ft. 10½in., length 36ft. and height 12ft. 6in.

The *Gloster F.5/34* single-seater multi-gun fighter (Mercury IX) is an eyeable machine of advanced design. Photographs appear on page 18a. After a dive this machine must have zoomed for something like 4,000ft. Its measurements are: 38ft. 2in., length 32ft. ¾in. and height 10ft. 2in.

This year the kite balloon was attacked and defended by 1914-1918 aircraft. There were to have been two balloons, but one was prematurely destroyed at Friday's rehearsal, to the delight of the schoolchildren, who for the first time did not have this spectacle left to their imagination.

Port Hendon has a really unhappy afternoon. No wonder, when Blenheims and other bombers have bestowed their blessings on it.

The *Blackburn fleet fighter dive bomber* (Mercury IX) was painted battleship grey and was flying with its undercarriage down. Photographs of this machine appear on p. 18c of this issue. Dimensions are: Span 46ft., length 33ft. 4¼in. and height. 11ft. 10in.

In accordance with the decision that machines which did not take part in the rehearsal should not fly on Saturday, the *De Havilland Albatross* transatlantic transport was allowed only to taxi round.

The cruising speed of the Albatross, which has four Gipsy Twelves with D.H. constant speed airscrews, is given as 210 m.p.h. at 10,000ft.

Dimensions are: Span 105ft., length 71ft. 6in. and height 17ft. 6in.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS

OUT OF THE PAST : It is almost exactly a hundred years ago since Charles Greens' great Nassau balloon covered 500 miles in 18 hours. During that century the sport has flourished and almost died, the annual Gordon Bennett Race now being the only noticeable manifestation of its existence. The start of this year's race, from Brussels on June 20, is seen above.

A PILOT was able last week to land his machine without injury to himself or to his passenger after the airscrew had broken away and cut through the rudder while flying at about 1,500ft. near Crewe.

The ashes of Sir Eric Geddes, late chairman of Imperial Airways, Ltd., were scattered from the Empire boat *Caledonia* last Friday night over the English Channel on the route to Alexandria.

Mrs. Amelia Earhart-Putnam who is now nearing the completion of her world flight, her average daily mileage having been about nine hundred. While the Electra was crossing India eagles caused some trouble and were found flying as high as 5,000ft.

The three Russian airmen, Chkaloff, Baidukoff and Beliakoff, who landed on the banks of Columbia River, Vancouver, on June 21, flew on to San Francisco in a chartered machine. Their own monoplane is being dismantled at the Vancouver military airport prior to shipment back to Russia.

The week of the F.A.I. Conference ended on a festive note last Sunday, when the delegates, in some fifty aeroplanes—which included *Heracles*—visited Ratcliffe, Leicestershire, as the guests of Mr. W. Lindsay Everard, M.P. Five machines from Germany and an amphibian from France were among the fleet.

Thousands of workers headed by Stalin gathered at the Moscow central aerodrome last Saturday to welcome Professor Schmidt and other members of the expedition which flew over the Pole.

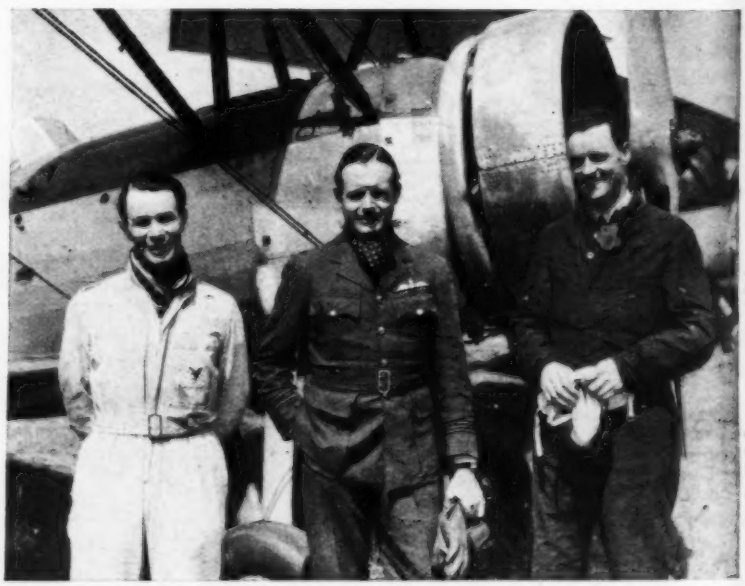
The first non-stop American trans-Continental flight in a seaplane was made by Mr. Richard Archbold last Friday. He flew from San Diego, California to North Beach Airport, New York, in 17 hr. 2 min. Presumably the machine was his twin-engined Consolidated flying boat.

Twenty-five Years Ago

From "Flight" of June 29, 1912.

"Monoplane design has been settling down to such well defined lines of late that the particulars of the new Codi monoplane we are able to publish this week will come as quite a shock to those who have been reckoning that something like finality of design has been reached in aeroplanes of the single-deck type. Its immense size and marked originality were the chief characteristics of his first biplane. His new monoplane is no exception to the rule."

[The machine referred to had a span of 46ft. 6in. and a length of 37ft. These figures are within a few inches of the dimensions of the De Havilland Don.]



RIGHT WAY UP ! During a recent visit to the C.F.S., *Flight's* photographer inveigled these three pilots into a "close-up." Since the Hendon Display crowd *almost* saw their faces as they flew their Avro Tutors inverted at low altitude, we make no apology for departing from the Hendon "no limelight" convention. Left to right : Flt. Lts. Mermagen and Stephenson and Flt. Sergt. Scragg.

CORRESPONDENCE

The Editor does not himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

INTERCEPTED—BY HAWKERS

I CANNOT help feeling that the Royal Air Force display, however brilliant the flying programme and the organisation inside the aerodrome boundaries, suffers badly in public estimation by the conditions which always seem to prevail outside.

This year I can speak both as a railway-traveller-cum-pedestrian and as a motorist, since I travelled there by tube and returned by car. On arriving, one was pestered and deafened by a veritable horde of raucous-voiced hawkers who thrust unofficial programmes under one's nose; one also seemed to be expected to consume ice-cream or peanuts, read comic papers or play with toy aeroplanes or celluloid dolls. I have no quarrel with men earning a (comparatively) honest living, but when one almost has to fight one's way along Colindale Avenue the thing becomes rather more than a joke. The earnest-looking individuals with placards beseeching us to remember what bombers are for are in rather a different category from the hawkers and, whatever one's own views, one must acknowledge the courage of these prophets in a wilderness.

The return journey, by car, was purgatory of a different kind—less violent but far more protracted. Each year we are told that it is hoped to improve the traffic arrangements, and each year the jam seems to become worse.

Next year I shall seriously consider whether it will not be better to enjoy my Hendon Display with the sole aid of the B.B.C. and *Flight*. C. E. E.

London, W.1.

[Our own experience leads us to agree entirely with our correspondent. A friend took two and a half hours to travel from Hendon to Hampstead after the show. Traffic at Wimbledon, the Aldershot Tattoo and other big-crowd events seems to be far better organised, though we can appreciate that Hendon's exits and entrances are not ideally laid out from the traffic-handling point of view.—ED.]

THE BERMUDA BROADCAST

THE two recent broadcasts of the flight of *Cavalier* from Bermuda to Long Island, whilst very well done, were all too short. I cannot help wondering why so much notice was taken of this flight whilst the far more important first flights of *Canopus* or the inaugural flights from Southampton to Marseilles were ignored by the B.B.C.

Is it possible that the N.B.C. of America are more air-minded than our B.B.C. and offered the latter the facilities as a matter of course? I believe the broadcast was relayed over most of the American continent. W. LIONEL NAYLOR.

London, W.9.

AIRPORT SERVICE

I HAD occasion last week [our correspondent writes on June 15—ED.] to go to Gatwick Aerodrome at 7.45 p.m., intending to fill up with petrol and oil, hangar the machine for the night, and be away, with five passengers, at 7 a.m. the next day.

On arrival at Gatwick I found that, as Messrs. Air Travel were closed for the day, no supplies at all were available and no hangar accommodation for an aircraft of a mere 42 ft. span.

That such a state of affairs can exist at an airport which, we have been told, is the most modern in Europe, is incredible. Courtesy and goodwill I found in abundance, but that was all. When called upon to pay a landing fee, I trust the cash was tendered with an equal display of courtesy. (I *had* no goodwill.)

Redhill supplied my needs and proved in every way 100 per cent. My thanks to them!

Barnstaple. R. T. BOYD.

[We certainly agree that such services should be available day and night at any important airport. Air Travel, however, as a concern devoted largely to repair and manufacturing work, are not the owners of the airport and could not necessarily be expected to have personnel on duty for twenty-four hours a day and seven days a week. Neither is a transport-operating company to be expected to provide housing and refuelling facilities. All we can say is that *somebody* ought to have been there to provide them.—ED.]

AERODROME TRANSPORT

WE have read with interest the remarks of "Indicator" in *Flight* of June 17 regarding the desirability of "drive-yourself" hire cars at aerodromes. Our managing director—a private owner since 1929—felt the need of such cars. Accordingly, since 1936 this firm has hired 10 h.p. cars to those landing at Aberdeen Airport.

We may add that passengers carried on our airlines from Orkney and Shetland find this a considerable advantage, because when proceeding on holiday they need not take their cars south. This enables them to use the air, instead of the sea, and thereby adds at least a couple of days to their vacation. ALLIED AIRWAYS (GANDER DOWER), LTD.

Aberdeen Airport.

REVIVING THE BLIMP

MAY I comment on Capt. Boothby's letter on airships in the June 17 issue of *Flight*? I do not foresee the use of airships of 1914-18 design for service to-day. But as no modern British lighter-than-air craft are in existence it was necessary to base my arguments on war-time examples which could carry out the suggested duties quite well.

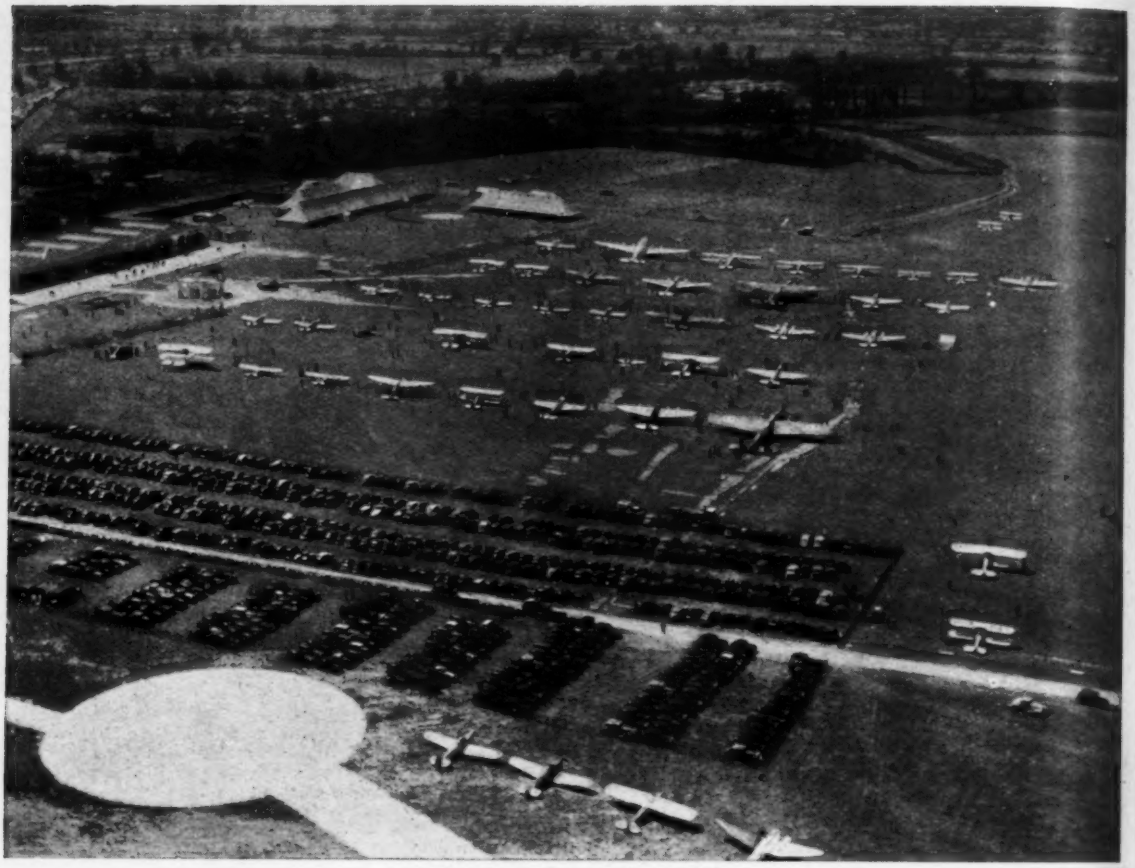
But I do not doubt that with the increase of our knowledge of aerodynamics and the improvement in design of aero engines much better airships could be built to-day than ever before.

To add an allowance for this would add some strength to the case for a revival of service airships, which seems to me to be overwhelmingly strong without it. W. O. MANNING.

London W 1

Forthcoming Events

July 1. Aero Golfing Society: *Flight* Trophy.
July 3. Newcastle-on-Tyne Aero Club: Newcastle Trophy Race.
July 3. Ramsgate Airport, Official Opening.
July 4. Brooklands Club: Supper Patrol.
July 4-18. Aero Club of Germany: Wasserkuppe Gliding Meeting.
July 10. Cardiff Aeroplane Club: London-Cardiff Race.
July 10. Lancashire Aero Club: Garden Party.
July 11. Herts and Essex Aeroplane Club: Air Display, Broxbourne.
July 11. Italian Aero Club: Circuit of Rome.
July 15. Aero Golfing Society: Jubilee Cup.
July 17. Portsmouth Aero Club: Garden Party.
July 17-18. Deauville Rally.
July 18. Witney and Oxford Aero Club: Garden Party and Opening of new Witney Aeronautical College Buildings.
July 23-August 1. Swiss International Meeting.
July 24. Devon Air Day and Race: Plymouth and Exeter.
July 30-August 15. "Avia" Aero Exhibition, the Hague.
July 31. Cinque Ports Flying Club: Folkestone Aero Trophy Race.
July 31-August 2. Yorkshire Gliding Club: Opening Meeting, Sutton Bank.
August 1-14. Yorkshire Gliding Club: Instructional Camp Sutton Bank.
August 3-September 7. Public Schools Aviation Camp Norwich.
August 6-7. Austrian Aero Club: International Rally, Lake Worth.
August 14. Eastbourne Flying Club: At Home.
August 14-22. Yorkshire Gliding Club: Open Contest, Sutton Bank.
August 20. L'Aéro-Club de France: Marseilles—Damascus—Paris Race.
August 21. Thanet Aero Club: Aviation Meeting and Race.
August 21. Midland Aero Club: At Home.
August 22-29. Italian Aero Club: Circuit of Littorio.
August 28 and 29. Cinque Ports Flying Club: Lympne International Rally and Wakefield Trophy Race.
August 28-September 25. B.G.A. National Soaring Competition, Great Hucklow.
September 4 and 5. Southend Flying Club: At Home.
September 10-11. R.Ae.C.: King's Cup Race.
September 12. Aero Club de France: Coupe Deutsch de la Meurthe, Etampes.
September 23. Aero Golfing Society: Cellon Trophy.



A fine aerial impression of Hatfield in gala dress for the Show. (*Flight* photograph.)

THE S.B.A.C. DISPLAY AND EXHIBITION, 1937

An Event that has Acquired the Importance of a National Aero Show : Hatfield's Two Busy Days Described

A CROP of new high-powered engines, with features which were more or less secret until a few days ago, and the world's fastest bombers and trainers: these were highlights at this year's S.B.A.C. display and exhibition staged at Hatfield on Monday and Tuesday. Monday was devoted entirely to an inspection of the "static" exhibits and of the aircraft parked on the aerodrome, the flying programme being scheduled for Tuesday, when the "static" section was again open for inspection.

Recent secrecy regulations appeared to have befuddled aircraft constructors to such an extent that in certain cases they seemed unduly cautious in imparting information to visitors.

As there was no flying to be done on Monday, certain test pilots were to be seen distributing the "inside dope" on the qualities of their company's products, their words falling upon ears which, although all but invulnerable to stock sales talk, became reverently attentive to such authoritative utterances.

Although the accessory exhibits included few entire novelties, they held much greater interest than might have been anticipated. A detailed advance review of the various offerings was made in *Flight* last week.

Airscrew manufacturers were particularly well represented, and it was gratifying to note that the operation of transmission systems was clarified by working examples which demonstrated the various principles employed.

Some impressions gathered during an inspection of the aircraft and engines exhibited are given hereafter.

Inquisitive technicians were able to glean comparatively little from a tour of the machine park. Machines considered—rightly or wrongly—to be the slightest bit "hush-hush" were roped off, and internal inspection was normally impossible.

On an occasion like the S.B.A.C. Display it is always nice to parade before one's foreign rivals some product to which they are unable temporarily to make a challenging reply. Last year the shining example was the Supermarine Spitfire, which is still, by the way, the world's fastest fighter.

On Monday there were arranged at Hatfield the world's fastest practical twin-engined and single-engined bombers, three trainers developed specially for the coaching of personnel in the operation of the advanced military monoplanes such as have appeared at the last two S.B.A.C. displays, and aircraft of all denominations, the majority of which are as good as, or better than, anything comparable offered abroad.

The Hawker Henley and Fairey P.4/34 (both light bombers to the same specification) were eyed covetously. Evidently they are worthy successors, in foreign eyes, to the Hart and Fox, and are potentially far more than light dive bombers.

It was enlightening to compare the engine installations on these machines. The Merlin in the Fairey has a ducted radiator set in the conventional position under the fuselage, whereas that on the Hawker sported the new Rolls-Royce system wherein there is a large scoop just behind the airscrew which houses the radiator matrix, air intake and oil cooler.

Talking of radiators, that on the Hurricane is set farther back than is normal and is made in the form of a scoop. The single-entry up-draught air intake is just ahead.

A number of people were surprised to find that the Aquila in the Vickers Venom fighter has a "swinging gate" type of engine mounting. There seems to be a great deal to be said for this handy little fighter, which is no doubt quite as destructive and just about as fast as machines with much more horse power. The Aquila is light, economical, easily maintained and lends itself to rapid quantity production.

The engine installation (Kestrel XVI) and undercarriage were but two of the fetching features on the 295 m.p.h. Miles advanced trainer. The same type of undercarriage, by Lockheed, was demonstrated on a mock-up structure in front of the static exhibition.

The Bristol installations were models of neatness with their leading edge exhaust collector rings, single exhaust outlet and, in the majority of cases, controllable gills. In the Walrus, where the Pegasus VI is installed as a pusher, it is not practicable to fit an exhaust manifold, which accounts for the comparatively noisy passage of this machine. The subdued note of the Perseus in the Hawker dive bomber and of the Aquila in the Vickers Venom portended popularity for these sleeve-valve units as marked among peaceful laymen as with efficiency-seeking technicians.

ARMAMENT

A detailed study of armament and of the accommodation in the military types was impossible. One did note, however, that the lower rear gun position in the Hampden has been revised. Even now it seems to be only temporary.

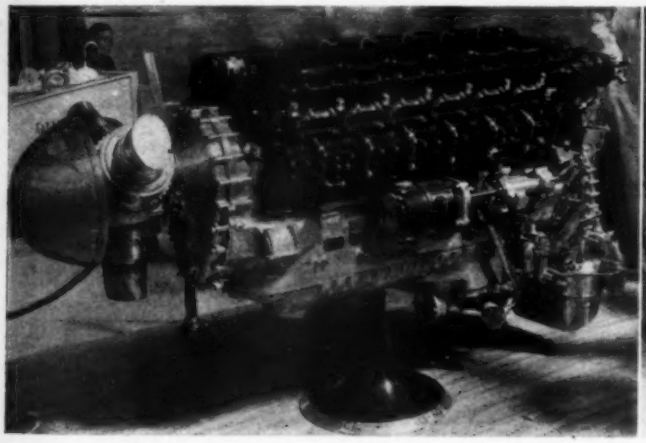
The Whitley's front and rear turrets had been deleted and the positions covered in by appropriate fairings. It is said that Nash and Thompson turrets are awaited. Power-driven turrets are almost essential in a machine like the Whitley, which, in its Mk. II and III forms, with two-speed supercharged Tiger VIII engines, must do over 200 m.p.h. The Whitleys so far delivered to the Service have had manually operated Armstrong Whitworth turrets. These latter devices appeared on the Anson, the Oxford and the Don.

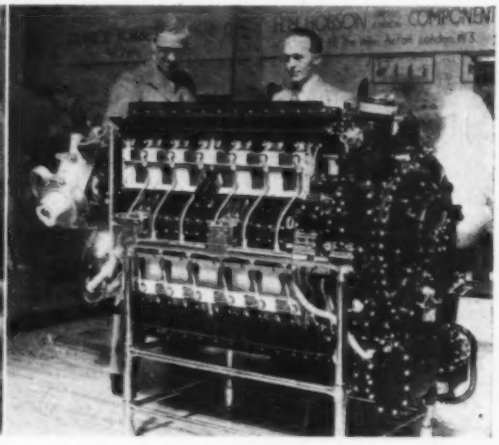
The two last-named machines, by the way, were studied not only as standard types of R.A.F. trainers, but as potential general purpose machines offering great versatility and good performance for a comparatively low expenditure of cash and power. Airspeeds are actually offering a G.P. version of the Oxford, known as the A.S. 10 G.P. Loaded to 7,300 lb. they estimate that this version will do 185 m.p.h. with two of the new Cheetah Xs and fixed-pitch airscrews.

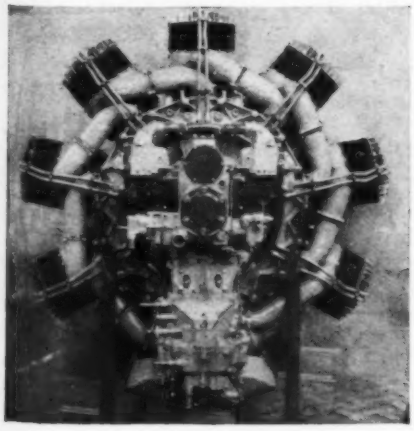
Talking of "G.P.s" reminds us how futile it is to try to convey the scope of a machine's capabilities in a single phrase. Specialisation is becoming imperative, we are told, yet even specialised aircraft like the Hawker and Fairey are essentially general purpose machines. Some people favoured the Fairey particularly as a two-seater fighter. The Wellesley is generally categorised by the Air Ministry as a medium bomber, but it was designed as a private venture to an Air Ministry general purpose specification, and into the bargain it is a first-rate torpedo-carrier.

The presence of the Wellesley, incidentally, was somewhat tantalising, for although figures have lately been issued for the performance of this geodetic marvel particulars of the structural system may not yet be imparted. According to the latest figures obtained during contractors' trials the Wellesley does 226.5 m.p.h. at nearly 20,000 ft.

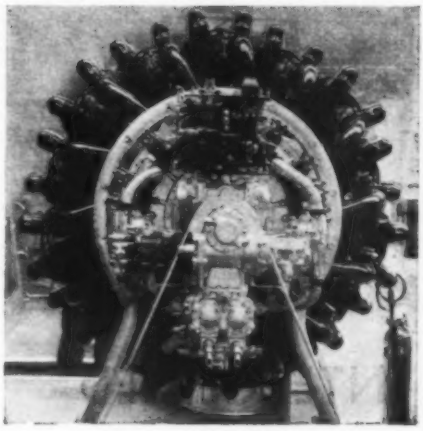
(*Continued on page* 18.)







(Top left) The liquid-cooled Rolls - Royce Merlin F engine equipped with Rotol v.p. airscrew mechanism. (Top right) As compact a power unit as one could conceive is the 24-cylinder Napier E-108. Behind it are Mr. Savage, Napier's general manager, and Capt. Rogers of Imperial Airways. (Left) A modification to the Bristol Perseus sleeve-valve engine: the nine induction pipes are now seen to be longer and cranked. (Right) A rear view of the Armstrong Siddeley two-row Tiger VIII. (*Flight* photographs.)



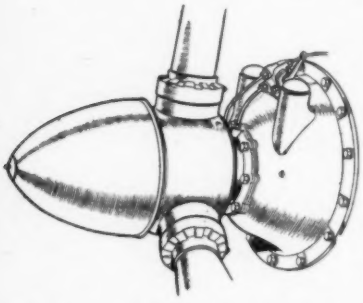
INTERCEPTED

Inspired by the spectacle of a "next war" air battle at the R.A.F. Display—an impression, specially drawn for *Flight* by F. Gordon-Crosby, of Handley Page Harrow heavy bombers, flying high over enemy territory, being attacked by hostile fighters. The interceptors are seen diving with a view to zooming from beneath. But with fifty guns to a squadron the Harrows are by no means "cold meat" for a defensive force.

ENGINES

THE smallest engine to be seen in this year's "static" was the Aeronca J.A.P., which gives 36-38 h.p. Finned oil sump and "Y"-shaped exhaust incorporating a hot-spot air intake are the characteristic features of this small horizontal twin, which appears to be unchanged.

Making their first public appearance, the Alvis models, the Pelides and Alcides (which were recently described in detail in *Flight*) caused great interest. The Alcides is a very large two-row eighteen-cylinder radial with full complement of accessories. Power figures give the take-off output as 1,700 h.p. for the moderately supercharged version and 1,550 for the Major. The weight is 1,670 lb. Thus the Alcides is the first production engine to give more than one h.p. per pound weight. The rating of 1,650 h.p. is given at 5,000 ft. A moderately supercharged two-row fourteen-cylinder model was also shown—the Pelides, which gives 1,000-1,050 h.p. at 5,000 ft. Alvis, Ltd., have recently laid down their own foundry for casting cylinder heads, and samples of these most complicated cast-



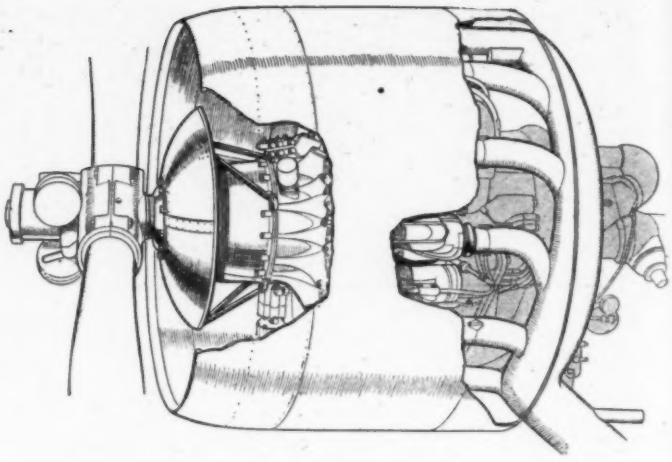
Hub of the new Fairey infinitely variable-pitch airscrew. It is hydraulically operated.

ings were exhibited. The Alcides is shortly going to be type-tested with two-speed supercharger.

Armstrong Siddeley Motors were represented in the large category by the Tiger VIII, a very modern two-row fourteen-cylinder radial with a power rating of 810 at 14,000 ft. This is the first engine in production with a two-speed supercharger. The seven-cylinder Cheetah X, which gives 340 h.p. at 7,100 ft., and the low-compressioned unsupercharged Cheetah VA, were also to be seen on the stand. Internal details must be withheld, but a two-speed supercharger housing and wheelcase were shown as a separate exhibit for external examination.

In the Cirrus engine section of Blackburn Aircraft, Ltd., the four-cylinder, inverted in-line brothers Minor and Major were to be seen. The latest Major, we hear, has now flown for many hours powering training types.

As impressive a Bristol display as one could wish for was made up of the Pegasus XVIII and the sleeve-valved Hercules, Perseus and Aquila. A first appearance of a Bristol two-speed supercharged engine giving 800 h.p. at 15,500 ft.—the Pegasus XVIII—was in itself of great interest, while the new Perseus induction system and location of accessories with remote drive gear box were at once apparent. In a recent type test



An Alvis Pelides Major (1,000–1,050 h.p.) was shown with a "dish-pan" cowling. Cooling gills (not shown) form the rear end of the cowling.

the moderately supercharged Perseus gave a rated output of 715-745 b.h.p. at 6,500 ft. at 2,400 r.p.m. Maximum power was 860-890 at 7,000 ft. The two-row Hercules, Bristol's largest is of 38.7 litres capacity and moderately supercharged gives 1,325-1,375 h.p. maximum and 1,150 normal h.p. at 5,000 ft. The Aquila displayed was the civil-rated version of the engine, which is at present undergoing intensive development.

Every unit of the Gipsy Major II could be examined separately on the De Havilland stand, while a complete engine, its familiar lines having a specially refined look with v.p. airscrew equipment, was also shown. A combined power figure of 125-140 h.p. is given officially for the modified unit, which weighs 5 lb. more than the Series I without its airscrew boss. Besides various sizes of airscrew a Series II Gipsy Six was also on view.

A centre of interest was the Napier E.108 modified Dagger, with a raised and ribbed airscrew shaft and housing equipped for v.p. operation. The supercharger is completely redesigned, and, although in this example it is shown with a single stage, it has dual induction intakes. Accessories are housed differently and the S.U. carburettor is of a new design. Napier engine parts were to be seen in a separate showcase.

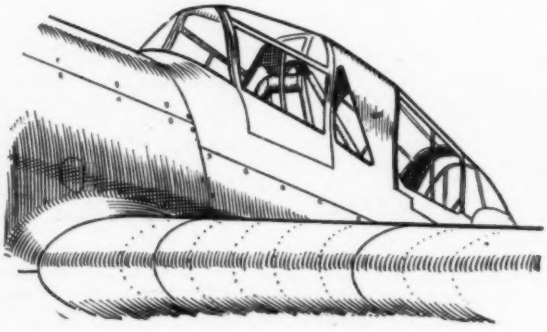
A cowled example of the Niagara V seven-cylinder radial could be examined on the Pobjoy stand, and separate crankshaft, connecting rod and reduction gear and drive assemblies showed the excellent workmanship put into the moving parts of this little unit.

The long, sleek lines of the Rolls-Royce Merlin F with Rotol v.p. airscrew equipment attracted many admiring onlookers to the stand, which also held a supercharged Kestrel XVI engine. This latest member of the long Kestrel range gives 690 h.p. at 11,000 ft., and is also available with v.p. airscrew equipment, when the rating is 710 h.p. at 12,000 ft. The weight is 955 lb. for Kestrels XIV, XV and XVI, the only difference in which is reduction gear ratio. The large diameter of the Merlin supercharger and the multiple accessories and controls always give rise to comment.

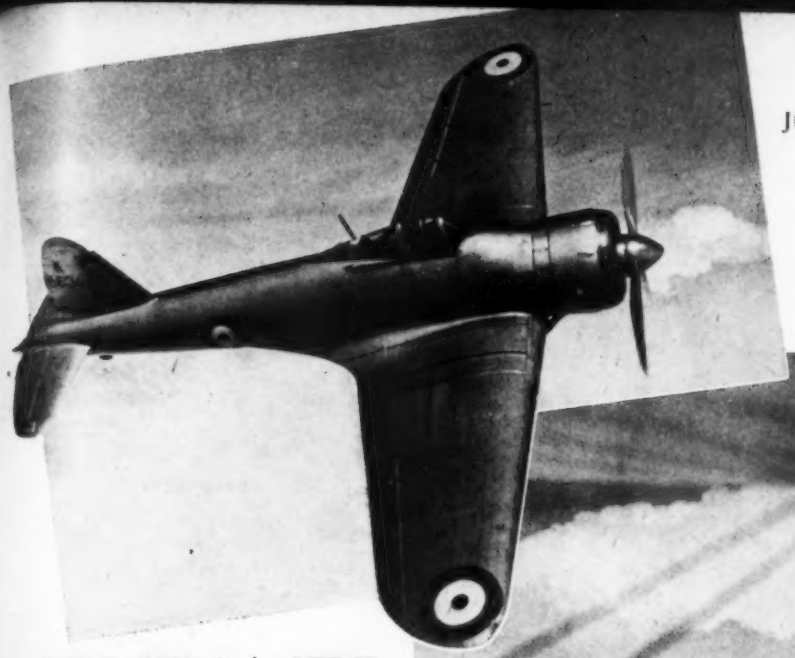
LAST TUESDAY'S FLYING DISPLAY

Mr. G. A. V. Tyson up, the Avro Anson general reconnaissance monoplane (two Cheetah IXs) set things moving with some steeply banked circuits of the aerodrome, following up with some plain and fancy diving and climbing. Having collected a few dozen knots in one dive past, Mr. Tyson eased the machine up into the smoothest and prettiest of loops, revealing a side of the Anson's character which is not familiar to everyone. The slow fly-past was well received. Throughout the Anson's demonstration the announcer proffered well-timed tit-bits of information about the machine and its characteristics.

(*Continued on page* 19.)



The Hawker Henley's cockpit enclosure. Internal bracing protects the pilot in the event of a nose-over.



Four striking *Flight* photographs of the newest British single-seater multi-gun fighter—the Gloster F.5/34 with Bristol Mercury engine. In the lower view the machine is seen soon after taking off from the Hucclecote Aerodrome.

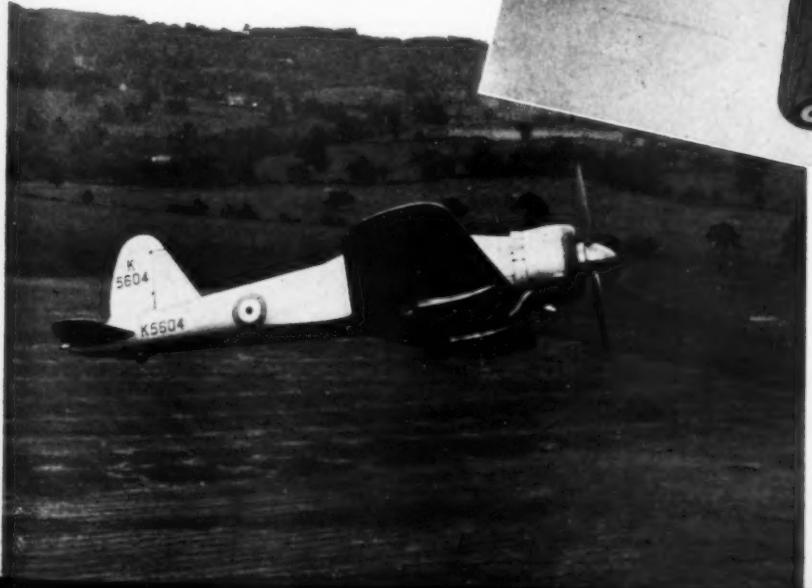
DEBUTANTE QUARTET

Four of Our Latest Military Aircraft : A Fighter, Two Advanced Trainers and a Fleet Fighter Dive Bomber

AMONG the new and experimental aircraft that were scheduled to appear at the R.A.F. Display, the Gloster F.5/34 single-seater fighter, the Miles and De Havilland advanced trainers, and the Blackburn fleet-fighter dive-bomber, all incorporate unorthodox features.

The Gloster fighter, a multi-gun model powered with a Bristol Mercury radial, which may later be changed for a sleeve-valve Perseus, has a metal monocoque fuselage and stressed-skin wings, only the elevator, rudder and ailerons being fabric-covered. In the light of the knowledge that certain fighters produced during the past eighteen months or two years have exceeded 300 m.p.h. it is safe to estimate that the Gloster will clock something like that figure.

The neat installation of the engine and airscrew is but one of the outstanding features. Controllable "gills" are fitted to the trailing edge of the Bristol long-chord cowling, which has a leading-edge exhaust collector ring, and the D.H. two-position airscrew has a spinner. A cowl round the reduction gear housing is also embodied.



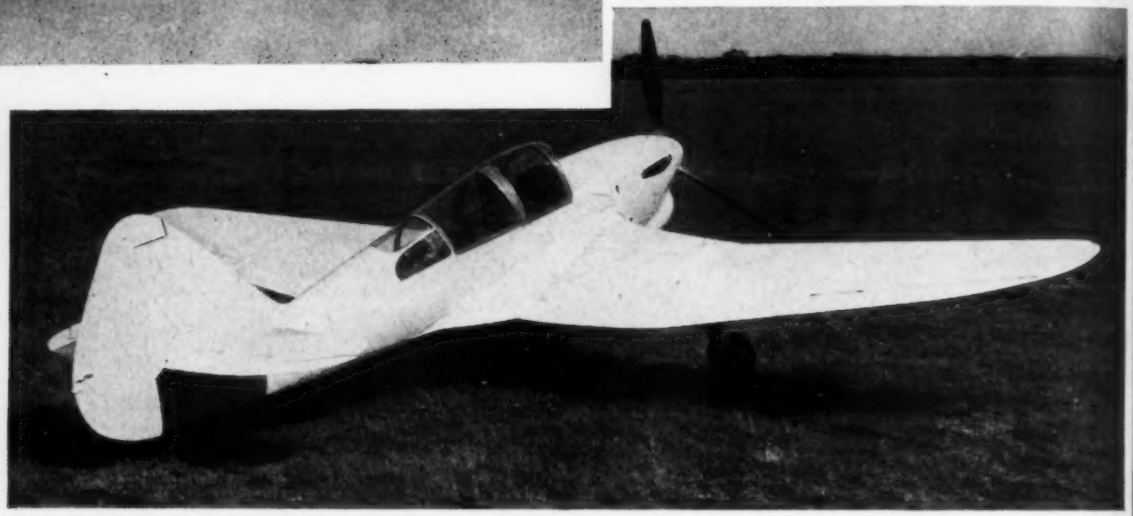
The Miles-Rolls-Royce monoplane is characterised by very attractive lines and a high performance. Powered with the latest type of fully supercharged Rolls-Royce Kestrel—the Mk. XVI, rated at 690 h.p. at 2,600

r.p.m. at 11,000ft.—the machine attains 295 m.p.h. in level flight.

Structurally, one of the most prominent features is the "cranking" of the wings, which might be described as of "inverted-gull" type. The undercarriage retracts completely with a twisting motion rearward. Miles split trailing edge flaps and a three-bladed De Havilland airscrew are specified.

The machine may be considered as a private venture to specification T.6/36 and bears the works number M.9. Data are: Span 39ft., length 30ft., height (tail down) 10ft., wing area 210 s. ft., weight empty 3,500lb., weight loaded 5,500lb., cruising speed at 11,000ft. at 2,600 r.p.m. at 2½lb./sq. in., boost 254 m.p.h., stalling speed 70 m.p.h., service ceiling 30,000 ft.

Less powerful and planned on somewhat different lines, the De Havilland Don has been adopted as a standard Service type, large numbers having been ordered "straight off the board." The engine has lately been officially

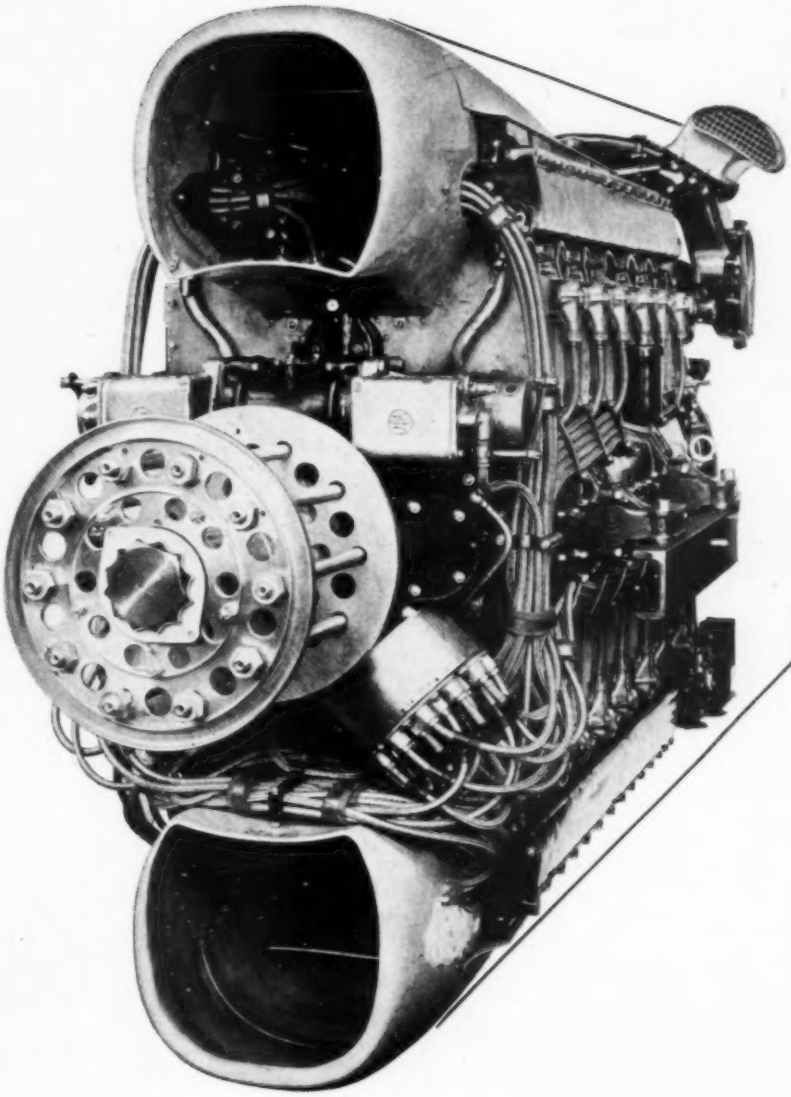


The Miles-Rolls-Royce advanced trainer-general-purpose-fighter-bomber-reconnaissance monoplane (above) does about 290 m.p.h. with a 690/750 h.p. fully supercharged Kestrel XVI.

Ordered in quantity for the R.A.F., the De Havilland Don advanced trainer is powered with one of the new D.H. Gipsyking inverted vee-twelves. (*Flight* photographs.)

"The smooth surge of power was pleasing and comforting."

"Flight"



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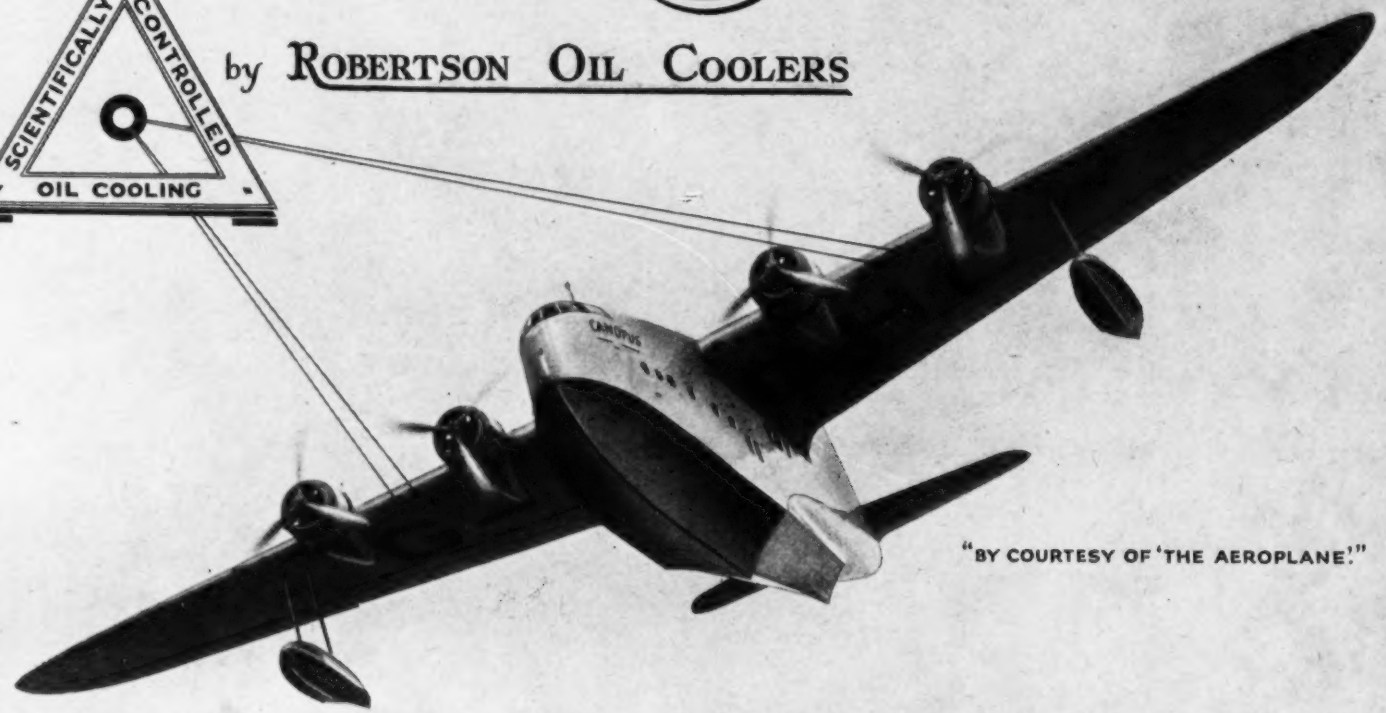

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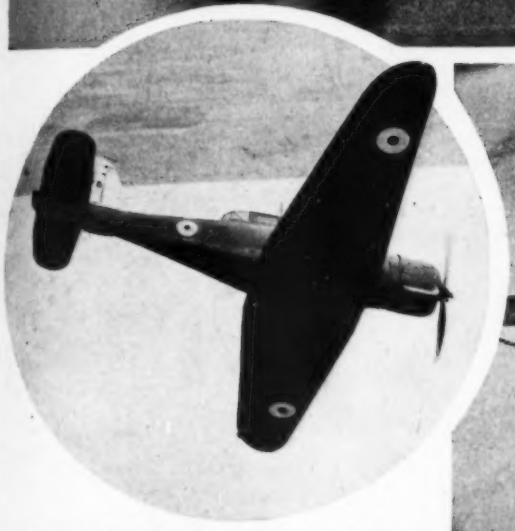
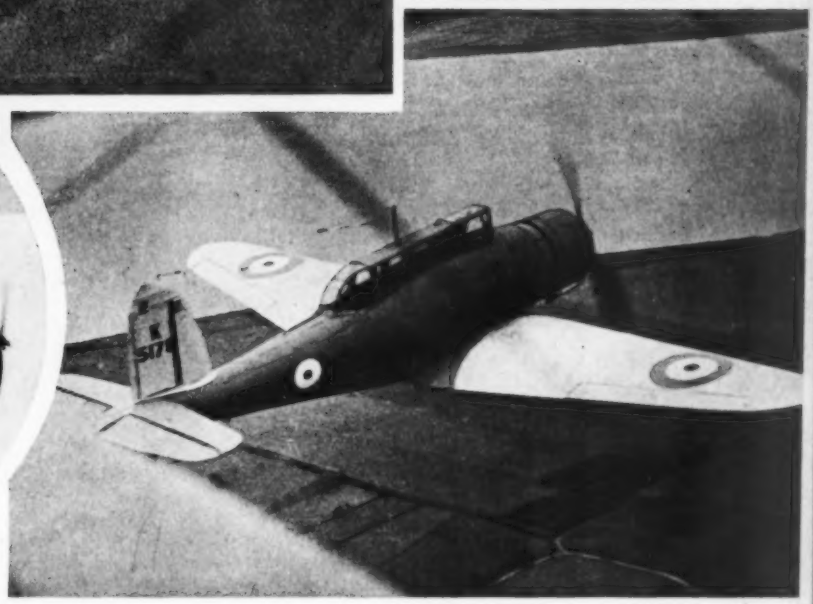
The Canopus, one of a fleet of twenty-eight Empire flying boats under construction for Imperial Airways by Short Bros. (Rochester and Bedford) Ltd.

The Canopus, one of a fleet of twenty-eight Empire flying boats under construction for Imperial Airways by Short Bros. (Rochester and Bedford) Ltd.





The new Blackburn fleet fighter dive bomber is seen in the upper picture diving with flaps down to retard its speed, and the lower views show the general layout of this interesting machine. The pilots above are Messrs. Blake and Bailey, who have done the test flying.

christened the Gipsyking I, but is better known as the Gipsy Twelve, and is similar to the power units in the D.H. Albatross. Complete particulars of this engine are not available. It is, however, a twelve-cylinder inverted vee model, geared and supercharged and delivering a maximum output of over 500 h.p. It is cooled by air taken in through tunnels in the leading edge of the cantilever wing and consequently it has been possible to design an exceptionally clean cowling with "liquid-cooled" lines.

Side-by-side dual controls are provided in the cabin, and there is an Armstrong-Whitworth gun turret for instructional purposes. With its roomy accommodation and high performance the Don should prove a very useful addition to the list of standard Service types. The estimated top speed is 223 m.p.h.

The third machine illustrated in these pages is the Blackburn fleet-fighter dive bomber monoplane which may soon be seen in service with Fleet Air Arm squadrons. A compact low-wing all-metal monoplane, this aircraft has folding wings, a watertight fuselage (built on a principle which has proved so successful on the large number of Shark T.S.R.s now in use), flaps, a retractable undercarriage and D.H. two-position airscrew. The engine in the prototype is the Bristol Mercury, but it is likely that production models will be fitted with engines of the sleeve-valve Perseus type which, as the machine is intended to function as a fighter, is likely to be fully supercharged. The cockpit enclosure will undoubtedly be welcomed by Fleet Air Arm personnel, as will the easy folding arrangements.

In order to retard the speed of the machine in a bombing dive towards its target the trailing-edge flaps are lowered, as may be seen in one of the accompanying photographs. It will be realised that an aircraft of such clean design gathers speed very quickly and, contrary to popular conception, this may be a serious disadvantage.

Sailplane Encyclopaedia

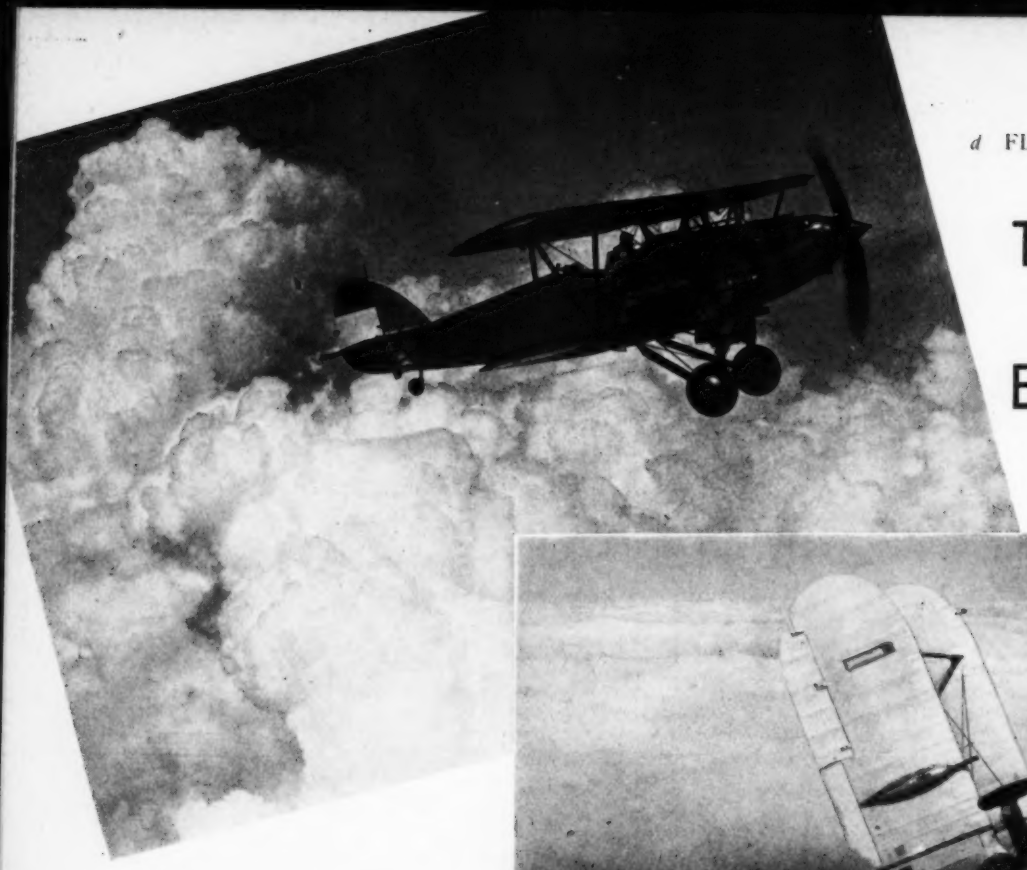
Sailplanes: Their Design, Construction and Pilotage, by C. H. Latimer Needham. (Chapman and Hall, Ltd., 11, Henrietta Street, W.C.2. 6s.).

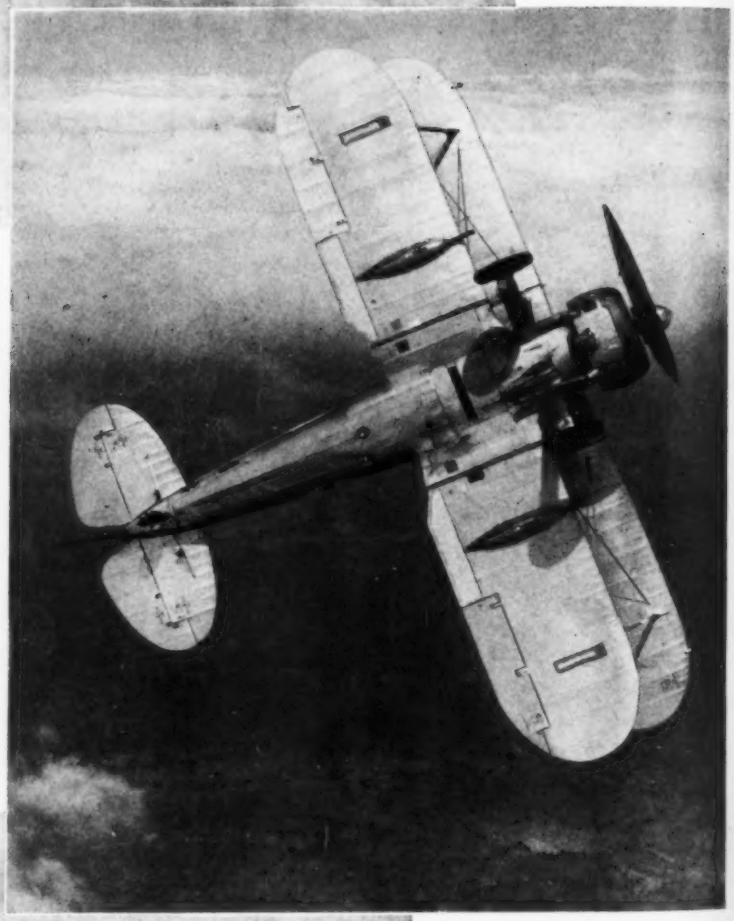
ORIGINALLY published in 1932, this new edition of *Sailplanes* is sold at a popular price. The general principles of sailplane construction and pilotage have not been altered since that time and the book is certainly one of the most thorough which has ever been written on the subject. The author was the first Englishman to obtain a "C" certificate, and he was closely connected with the gliding movement for many years.

In this "encyclopedia," Capt. Latimer Needham covers the whole work of sailplane design, starting on the assumption that the reader is familiar with the basic principles, and goes on to explain constructional methods and the technique of sailplane pilotage.

THREE for EXPORT

Illustrated with *Flight* Photographs





THE uppermost view on this page shows a Hawker Hind destined for Yugoslavia. This machine differs from the standard R.A.F. Hind in that it is fitted with the Rolls-Royce Kestrel XVI (690 h.p. at 11,000 ft.) which is provided with a central air intake forward of the radiator and a cylindrical oil cooler mounted in a trough on the starboard side of the cowling.

A very high performance should be obtained in view of the fact that the standard R.A.F. Hind does about 200 m.p.h. with a 600 h.p. Kestrel.

In the second view a number of features of the Gloster Gladiator may be seen to advantage. This machine is of a type which has aroused great interest in the export market. The engine is a Mercury IX and four guns are fitted.

The lower view shows a Portuguese Hind just after taking off from Brooklands. This model has a Kestrel V engine and is similar to the machines which equip several R.A.F. Squadrons.

The Hind is eminently suitable as a bomber (dive bombing being a speciality, as demonstrated in the R.A.F. Display), fighter or reconnaissance machine.

The top speed is about 200 m.p.h.

Rational, informative announcing, in fact, featured throughout the display.

A varied trio represented De Havillands on their home ground. First into the air was the Albatross, making its first public flying appearance. The take-off, with flaps about one-third down, was impressive and a steep zoom from low altitude was, for so large a machine as the Albatross, a revelation, while the contrast of slow flying with maximum level speed showed its remarkable flexibility. During the Albatross demonstration the 86B took off, displaying a good turn of speed, and in its ability to climb steeply indicated that there would be a considerable reserve of power even under full load. The ceiling on two of the four engines is between 2,000 and 4,000ft. Mr. Geoffrey de Havilland very ably demonstrated the flying properties of the Don trainer with its Gipsy Twelve (Gipsy King I) engine, diving at well over 200 m.p.h. to within 20ft. of the flying field and executing steep climbing turns.

Three Miles types took off in quick succession, the R.R. Trainer, the Magister and the Whitney Straight. Mr. Miles in person first threw the Whitney Straight about in a quite alarming manner, making one-wheel landings and emulating a large grasshopper on the flying field. Mr. H. W. C. Skinner, in the Magister, "dazzle"-painted in the true sense in red, yellow and white, then took over, and after showing the general flying qualities required of a trainer, gave a longish spell of inverted flying. Lastly, although the first of the three to leave the ground, the Kestrel XVI trainer suddenly appeared at high speed as if from nowhere and was as quickly gone again in a long steep climb into the blue. Its next appearance was equally fast over the crowd and finished in a climb and turn over and back. Having dived from several directions, the cream-coloured trainer came round in a gentle glide and gracefully alighted.

Both the Henley light bomber and the Hurricane multi-gun single-seater fighter were listed to appear for Hawkers, but only the two-seater, in charge of Mr. Philip Lucas, took off. This demonstration was studied with special attention because the Henley has lately been made the subject of a large Air Ministry production order.

A Hawker pair that aroused much interest, particularly among the foreign visitors—the P.4/34, or Henley, and (hiding behind it) the Hurricane. The Henley light bomber has been adopted by the Air Ministry. (*Flight* photograph.)

In accordance with an Air Ministry proviso that machines on the Part Publication List should not be demonstrated at low altitudes, Mr. Lucas was somewhat aloof, but he did show that our new standard light dive bomber can give any fighter a run for its money. Quick changeovers from bank to bank told of very powerful ailerons. A slow roll in which about 500ft. of height was gained was a feature of Mr. Lucas's masterly show.

In the absence of the Battle medium bomber, Flt. Lt. Staniland was left as the Fairey champion, mounted on the P.4/34 light bomber which seems, if one may mix metaphors, as fine a medium for his technique as he has yet handled. Staniland is particularly partial to rolls off long zooms in which manœuvres he is assisted by the Merlin's immense reserve of power. One of his most striking items was a lengthy period of inverted flying which went far toward compensating the guests for the omission—at official request—of his intimate slow rolls. He could not resist making his customary steeply banked circuits to round off his show.

Taking full advantage of its slots and flaps, v.p. airscrews and the high take-off power available from its two Pegasus engines, the Harrow heavy bomber, which, was teamed with the Hampden "medium" in the Handley Page effort, sailed up steeply and majestically after an incredibly short run. According to the announcer, the Hampden, which followed, was off in nine seconds.

Both machines flew past fast and slow, high and low, and were at all times very convincing. The high-spot was undoubtedly the Harrow's well-known imitation of vulture about to go to Lyonch. This was something the majority of the foreign guests did not expect from a high performance heavy bomber. Captain W. Rogers was at the wheel.

The Hampden was posed for inspection at all angles by Captain J. H. Cordes.

BRISTOLIANS

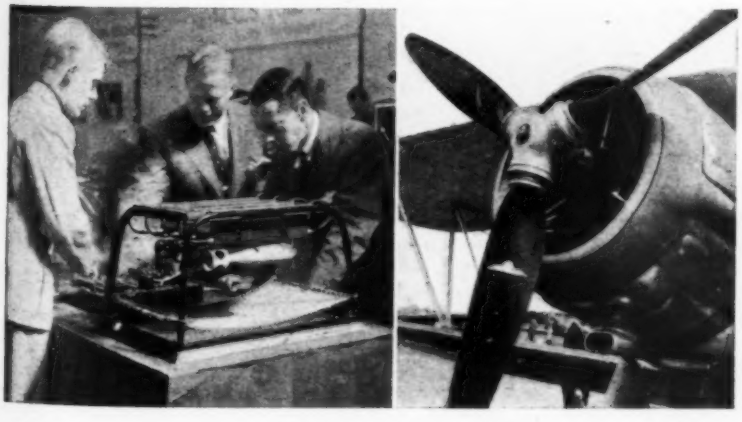
The Bristol demonstration was announced as intending to show an aeroplane (the Blenheim medium bomber with twin Mercury VIIIs) an engine (the sleeve-valve Perseus in a Hawker dive bomber biplane) and an airscrew (the Rotol fitted to a Mercury in a Hart). The responsible trinity were Messrs. Uwins, Pegg and Washer.

Flt./Lt. Uwins left not a shadow of a doubt that the Blenheim is the fastest and finest twin-engined bomber of its kind in the world. He has the happy knack of "putting over" a machine without resorting to cheap showmanship.

It seemed to be difficult to keep the Bristol-engined Hawkers on the ground; they seemed to be obsessed with an insatiable desire to point themselves skyward and to climb indefinitely at something approaching 90 degrees. The Mercury-Hart, with its businesslike three-bladed Rotol constant-speed airscrew, was off the ground in five seconds.

One could not help remarking that the Mercury advertised its presence more than the Perseus. The Perseus-engined dive bomber (with de Havilland v.p. airscrew) went gracefully through a short programme of rolls and loops.

Airspeed's only flying exhibit, the Oxford twin-engined trainer, carries very full equipment and has many good points for training duties, as the reader can see by turning to pages 26 and 27. Cruising speed at 7,000ft. is 161 m.p.h. and the duration is about 5½ hours. The



(Left) A "Static" cameo—low-altitude bombing with the aid of the Handley Page release gear. Other views in the Static section appear on pages 23-25. (Right) The Rotol v.p. airscrew installed on a Mercury-engined Hart. (*Flight* photograph.)

INCIDENTS at Hatfield last Tuesday: In the upper left-hand corner Mr. J. Lankester Parker is demonstrating the Short Empire boat *Calpurnia*. The picture of the "static" show indicates the lively interest visitors took in the exhibits. On the right, Mr. F. Handley Page is seen receiving Lord Swinton and Lt. Col. Muirhead, the new Under-Secretary of State for Air. The lower pictures show, from left to right, the H. P. Hampden; the De Havilland Albatross doing a steep bank against two of its engines; and the Bristol Blenheim.

fully loaded stalling speed at sea level is as low as 64 m.p.h. and the controls answered readily while demonstrating slow flying.

The Vickers Venom, the first high-performance single-seater fighter to be demonstrated, certainly set a standard of flying that would be hard to equal and almost impossible to better. The Aquila sleeve-valve engine was very quiet indeed, but gave no room for doubt as to power output in propelling the Venom in level flight or climb. The speed and manœuvrability of the Venom were outstanding, as shown by vertical turns alternately to right and left in quick succession, followed by a series of flick rolls.

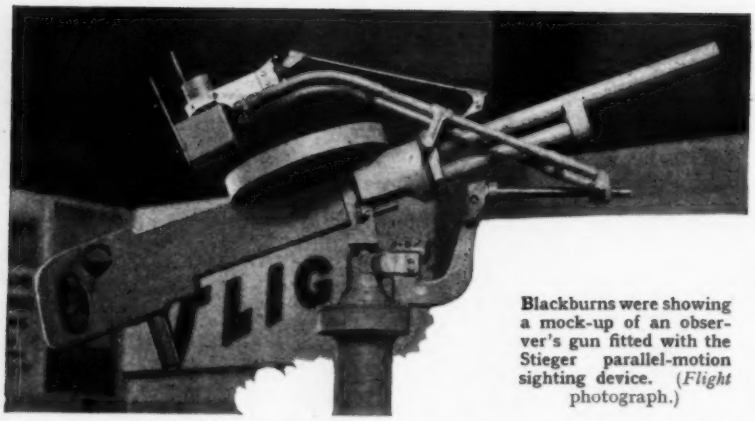
As the Venom came in the Wellesley took off. The commentator described the Wellesley as most interesting in view of its geodetic construction and unusually high aspect ratio of about nine as compared with the usual five or six. The Wellesley I is the first production type employing geodetic construction; weighing 6,235 lb., it has a disposable load for crew, fuel, etc., of 6,265 lb. The flying properties are of a high order; good lateral control was shown in a very

slow fly-past, and a dive followed by a maximum-speed crossing of the aerodrome, terminating in a zoom and neat loop, were very impressive. Maximum level speed is 202.5 m.p.h. at 8,000ft. A large portion of the span is covered by the flaps which are in two sections.

Making its first appearance at Hatfield the C.W.A. Cygnet Minor light monoplane was perhaps at a disadvantage in coming directly after the Venom and Wellesley. However, this little all-metal cabin monoplane gave a lively performance showing good control and plenty of power. The maximum speed is 125 m.p.h. and cruising 110 m.p.h. It held its own against any other aeroplane present when it came to landing. With flaps, the touch-down was made at about 35 m.p.h.

A lunch-time arrival was *Calpurnia*, latest Short Empire boat off the production line. In the hands of Mr. Lankester Parker, whose experience of these boats permitted unusually low and slow flying, *Calpurnia* made a sudden and impressive arrival, skimming in low over the hangars. Even more striking were his subsequent fast and slow passages across the aerodrome at almost zero altitude.

After the lunch interval—used by Mr. Clouston to try out the Hafner gyroplane—Mr. Hordern put up his usual restrained yet convincing demonstration of the Heston Phœnix, pale green against a patch of unusually blue sky. By way of contrast, a Blackburn Shark was the next to appear, Flt. Lt. Bailey taking it straight up and then diving full throatedly across the aerodrome. Having placed the Shark, so to speak, in the picture, he proceeded to slow roll and stall-turn this far-from-aerobatic-looking machine. His final approach was of the swish-tail light aircraft variety.



Blackburns were showing a mock-up of an observer's gun fitted with the Stieger parallel-motion sighting device. (*Flight* photograph.)

The idea of having two machines of dissimilar yet characteristic type in the air at once was a good one. After the Shark had landed, Capt. E. W. Percival took the Mew Gull into the sky, and Mr. M. S. Barrington the Vega Gull. While the Mew shot around at different altitudes and attitudes, leaving a trail of light smoke and a considerable impression of speed, the Vega flew for the most part quietly and sedately, though Mr. Barrington made one loop just to show that the machine was not all comfort and convenience. He then brought it in very low over the enclosures, with the engine just ticking over and the flaps down. As he flicked them up again the momentary sink could be clearly seen. While Capt. Percival gave his final rocket effect the rain came on heavily and the populace made for the "Static."

In due course the storm blew away and the dazzle-painted A. W. Whitley took off. It was difficult to believe that this machine, flown sedately around by Flt. Lt. C. K. Turner-Hughes, was travelling nearly as fast as the Mew, such was the effect of sheer size.

The Short Scion Senior, flown in this case by Mr. H. L. Piper, has a nice way of impressing people with the silence and comfort of air travel. Even when flying fast it is quiet, and Mr. Piper showed that it would fly and turn against the drag of two dead engines on one side.

The Gloster display may almost have been considered as a duet. While Flt. Lt. M. Daunt aerobated very effectively on the Gladiator, Mr. P. E. G. Sayer hung around in the distance with the monoplane fighter. When the Gladiator had done its last rocket loop, a half roll and aileron turn off the dive, the monoplane screamed across the sky, then climbed vertically and carried out the sort of aerobatic display which we still do not expect from low-wing monoplanes. It was superb, and the effect was increased by the comparative slowness and quietness of Flt. Lt. Sayer's final approach.

It is doubtful if the spectators quite expected the very short take-off and up-and-up climb, flaps down and slots open, of the Westland Lysander. In many ways the display was the most effective of the afternoon. The Lysander gave a remarkable demonstration of docile vigour and its strange appearance is not unattractive. Mr. Penrose finally brought it in very slowly indeed, demonstrated its full control at such low speeds, and put it down on the proverbial postage stamp.

The Aeronca was flown by Mr. Kirwan, who certainly knows how to make the best of 40-odd h.p. and showed that this little machine would do almost everything one could expect both as a means of transport and as a trainer.

Once again the Supermarine Walrus amphibian's performance must have come as a surprise to many. This large and matter-of-fact machine was flung about the sky by Flt. Lt. Pickering like any light aeroplane. He even looped it twice in succession and the noise was sufficiently effective.

Finally F/O. A. E. Clouston put the Hafner A.R.III gyroplane through its paces, making a really perfect climax to the afternoon's flying. No one is tired of watching its one-yard-or-less of take-off run, combined with a degree of manœuvrability in the air, and even on the ground, which must have been quite unexpected to those who had never seen it before.

THE DISPLAY BANQUET

THE organisation of the S.B.A.C. Display improves year by year. This was evident not only in the staging and execution of the show at Hatfield but in the holding of a banquet at Grosvenor House, London, on Monday evening, when the Society welcomed its guests. The latter had seen the static exhibition at Hatfield during the day and had examined the aircraft lined up on the aerodrome. Many of them had met and discussed points of mutual interest. The banquet afforded a further opportunity of "talking shop" and served, among other things, to get everyone into a receptive mood for Tuesday's flying display.

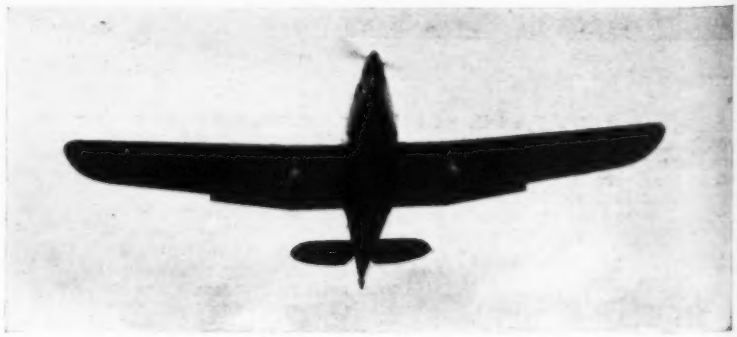
Lt.-Col. A. J. Muirhead, the new Under-Secretary of State for Air, proposed the toast of the S.B.A.C. and pleaded for lenience in view of the fact that he had been in office but little more than one month. He had, he said, thought of referring to the S.B.A.C. as having reached years of discretion (the society was founded in 1916), but remembered just in time that the Air Ministry was two years younger than the society, and such a remark might therefore be slightly risky. He did, however, congratulate the Society on coming of age.

The Air Ministry was anxious to see the industry maintain and extend its export trade, and the show at Hatfield that day was a fine practical example of how this ideal was being attained. Out of some 45 types of aircraft, about 20 were civil. The British ideal had always been to place safety and economy first and speed second. The military types at Hatfield proved that British constructors could design for speed when they wanted to.

Mr. F. Handley Page was at the top of his form and kept the large gathering interested and amused. He did not overlook the more serious side, and pointed out that some 150 years ago there was an industrial revolution, in which the weaver left his work at home and went into factories. The same principle was now being applied to warfare, and the human element was being replaced more and more. It was, he pointed out, sometimes thought that the British aircraft industry was so busy that it could not supply customers from abroad. That was not correct; the industry had been busy lately re-equipping its works. The benefit of this re-equipping would soon be available to foreign buyers.

Mr. A. F. Sidgreaves pointed out that the gathering that evening numbered approximately 800, of which some 450 were the guests of the Society from abroad and represented 47 different countries. This year, for the first time, the S.B.A.C. Display was a two-day affair. If this proved a success, it might be possible next year to extend the period to four days and to admit the general public during the last two.

H.H. Prince Bibesco, President of the F.A.I., spoke in French. On behalf of the many guests he tendered thanks for the charming hospitality which the foreign visitors had received during their stay in England.



The Percival Vega Gull demonstrating its slow-flying capabilities with flaps down

HERE and THERE

The G.A.P.A.N. Fund

SINCE the G.A.P.A.N. Benevolent Fund was launched at the beginning of May, a total of £1,059 8s. 6d. has been received. The objects of the Fund, which is to assist professional pilots or their dependants, were set forth on page 499 of *Flight* of May 20. Cheques should be made payable to the Guild of Air Pilots Benevolent Fund, and crossed "A/c Payee only." They should be sent to Mr. F. W. Jones, Hon. Organiser, Guild of Air Pilots Benevolent Fund, Room 172, Airport of London, Croydon, Surrey. An official receipt will be forwarded and acknowledgment made of all sums received in the Journal of the Guild.

Playing With Fire

SO long as petrol provides the propulsive element in aircraft we shall be faced with the fire problem—fires due to crashes, to backfires during engine starting, and to various causes among aeroplanes parked in hangars or elsewhere. The petrol fire often involves a simultaneous oil fire, and both require a special extinguishing technique.

Some modern methods evolved to deal with petroleum fires were shown recently by the Pyrene Company in the course of one of the periodical demonstrations given at their Great West Road, Brentford, factory.

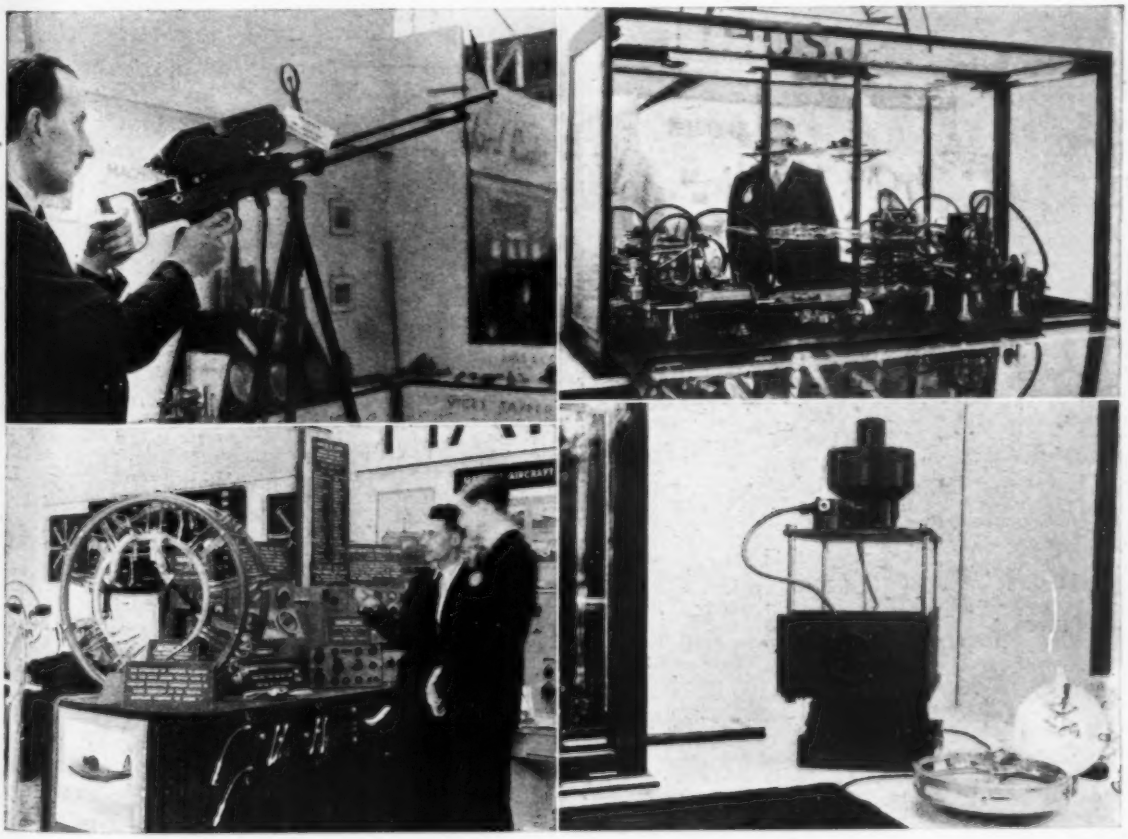
First, extinguishers charged with Pyrene liquid were operated, the principle being to exclude the atmosphere with a heavy wet vapour. A liquid carbon dioxide (CO_2) extinguisher was next used to put out a fire (of a sort possible in a hangar or workshop) caused by petrol and paraffin trickling from a drum.

After a demonstration of the Pyrene "Everyway" hose reel in use (which from a fixed revolving drum feeds out hose in any direction the operator may run), "the CO_2 hut" was lighted up: two 50 lb. CO_2 cylinders, brought into action automatically, dealt with a fierce fire in a reproduction of an electrical sub-station complete with transformer and cables, oil and petrol being poured inside to help the blaze.

"Phomene" extinguishers and foam-making branch-pipes (the latter for the production of foam from an ordinary water hose) were each shown before the *pièce de résistance*—the firing and extinguishing of the largest demonstration oil tank in this country. The great billows of smoke and flames—a most formidable spectacle—were effectively dealt with in a very short time by the No. 2 foam-making branch-pipe. The operator in this case carries the foam-making compound on his back and, when foam is required, regulates its supply via the branch pipe to the main water hose pipe.

Acid Test

IN co-operation with leading aircraft manufacturers, Exide have produced a new battery which has several very practical characteristics. Apart from a very high capacity/weight ratio, special vent plugs, baffle and cell design prevent splashing and spilling of the acid up to a tilt angle of 70 deg. in any direction. The cover is so moulded that the plugs protrude through it, thus facilitating topping-up. An acid level indicator is fitted to each cell, and the battery—which is made in two capacities—is approved by the Air Ministry for non-aerobatic aircraft. The Chloride Electrical Storage Co., Ltd., Clifton Junction, Manchester, are the makers.



STATIC I : Variety from the inside at Hatfield on Monday. (Top left) The Williamson Lewis-type camera gun. (Top right) One of the outstanding features of the Smith's Aircraft Instruments and Hughes stands was the automatic pilot. (Bottom left) Marconi screening harness for a Bristol engine. (Bottom right) The Holmes tele-compass, with 360 deg. indicator, on the Smith stand. (*Flight* photographs.)

R·A·F DISPLAY, HENDON, 1937
THIS IS ERNEST, OUR GUIDE AT THE SHOW— HE CLAIMS TO BE THE ONLY LIVING PERSON (OTHER THAN FLT/LT. BULMAN) WHO CAN CORRECTLY IDENTIFY ALL OF THE HAWKER TYPES AT A GLANCE—
YOU SEE, IF IT HAS A CUTAWAY GUNNERS COCKPIT, STUB EXHAUSTS, ETC. ITS A
HE THOUGHT THAT MR. GRAHAME-WHITE WOULD HAVE MADE A REALLY GOOD JOB OF THE HEADQUARTERS RACE
"THE CREW ESCAPES BY PARACHUTE"
AND WE THOUGHT WE KNEW ALL ABOUT GINNIES – WELL WELL
WHY, MR PEABODY!
20 YEARS AFTER— AND ALREADY ERNEST IS WONDERING WHAT WE SHALL SEE AT HENDON IN 1957!
INSTRUCTOR AND PUPIL — THE R.A.F. COMEDY TEAM, 'FLOPSAM AND REJECTSAM'
AS FOR NO 1 SQDN'S GRAND SHOW
THEORETICALLY THE THING IS IMPOSSIBLE
GOING HOME IN THE TRAIN, ERNEST COMPLAINED BITTERLY THAT SQUADRONS WERE RECEIVING NEW TYPES FASTER THAN HE COULD MAKE MODELS OF THEM.
CHRISTOPHER

STATIC III : (Left to right) **A demonstration set of Smiths' instruments, on the left of which is a panel incorporating blind flying instruments, including the new artificial horizon and directional gyro ; push-and-pull pastimes on the Teleflex Control stand ; put-and-take with the pipe-line and other fittings in the Vickers exhibit ; and an impressive radio array by R.T.E., including an ultra-short-wave approach beacon.** (*Flight* photographs.)

Concrete Apron Preparation

IN making concrete roads, floors, and aerodrome aprons the necessity for the prevention of sub-soil troubles is not always realised. When the wet concrete is laid the gauging water is apt to drain away to some extent from underneath, especially when the sub-soil is porous. During the setting and hardening of concrete it is essential for the best results that the water of hydration should remain intact throughout the entire period. Any local separation of water, even to a very slight extent, gives a concrete of inferior strength at the particular point, owing to non-uniform hardening. Consequently, draining away of water from beneath the concrete into the sub-soil results in a honeycomb structure in the bottom two or three inches, which reduces the strength of the road to a serious degree and may expose the reinforcement. Sometimes, also, the sub-soil contains impurities, such as acids or salts, which cause deterioration of the concrete by chemical action.

A simple, cheap, and efficient method of preventing sub-soil troubles is, it is claimed, the use of "Sisalkraft," a specially waterproof fabric of great strength somewhat resembling thick brown paper in general appearance and handling. This is laid over the ground and the concrete placed on the top to form the road or floor in the ordinary way, and the result is to prevent any trace of gauging water passing to the sub-soil. Where it can be substituted for a rough concrete bed, a saving of several pence per superficial yard can be effected. This method has already been used for about twenty R.A.F. aerodromes.

(*Continued on next page.*)

(Left) The Royal Air Force Display not-too-seriously seen.

STATIC II : (Left to right) Testing Dunlop braking efficiency ; tanks by E. G. Brown and Co. ; a demonstration rig of the Dowty retracting gear as fitted to the D.H. Don ; a modern Trojan horse—with legs by Lockheed ; Thompson Bros.' contribution to quick refuelling ; almost unlimited bits and pieces by Brown Brothers (Aircraft) Ltd. ; and some famous carburetters and mixture controls by Hobson. (*Flight* photographs.)

Essentially, "Sisalkraft" sub-soil grade, a production of J. H. Sankey and Son, Ltd., Aldwych House, London, W.C.2, is a five-ply fabric made under enormous pressure, consisting of a top layer of heavy kraft paper, a layer of bitumen, a central layer of sisal fibre, another layer of bitumen, and a final layer of kraft.

The result is a fabric of great strength, available in rolls 3ft. 6in. wide and 200 yards long, which, because of the bitumen layers, is absolutely impervious to water. The sisal is a strong non-elastic fibre, obtained from a species of plant belonging to the aloes family.

Uszczelka Glowicy Wysadzila

NOT so very long ago, it is alleged, there was published an English-French phrasebook which contained the magnificent sentence: "Stop, coachman! I fear one of the postilions has been struck by lightning."

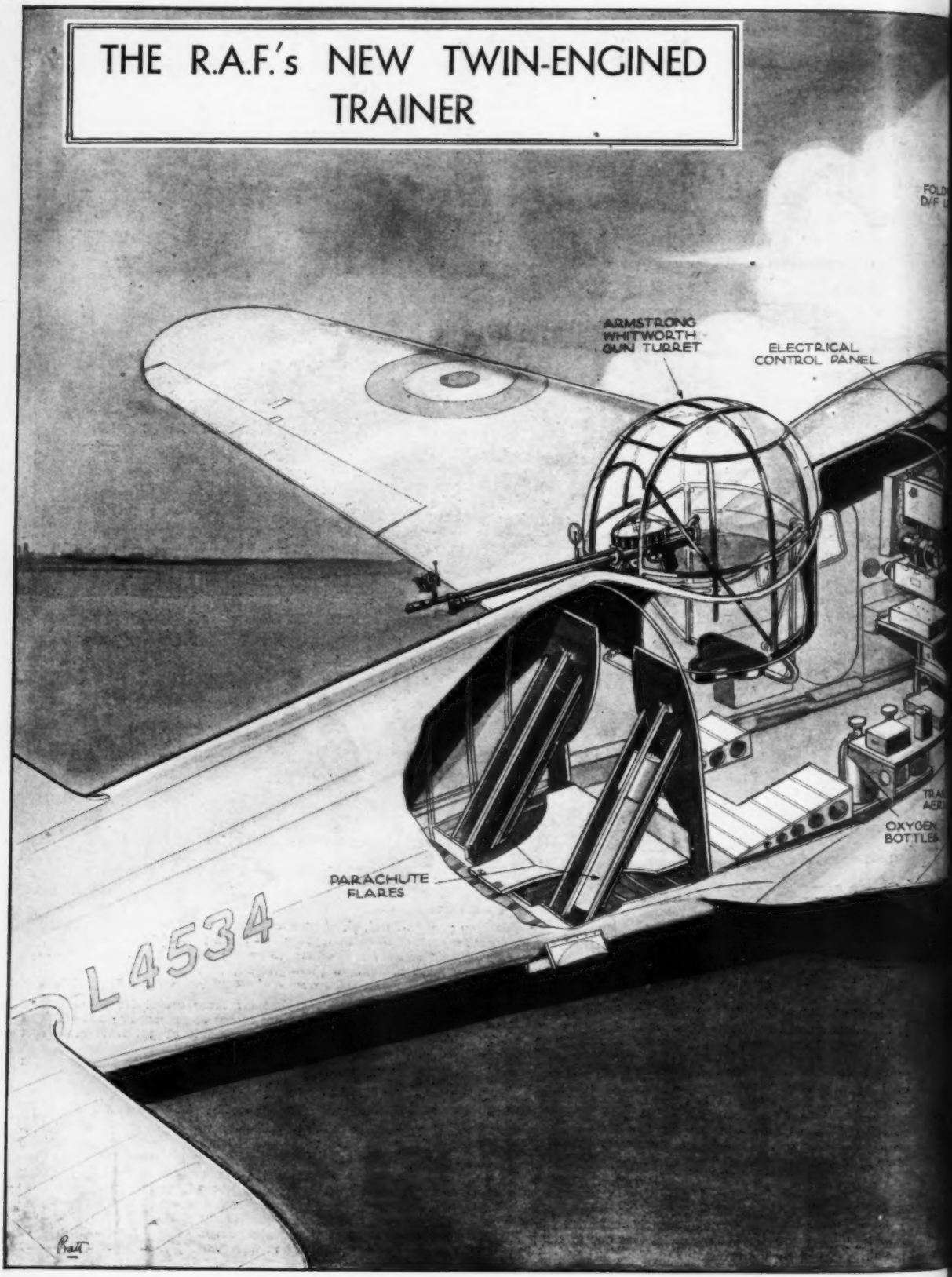
Now the Shell-Mex people have produced something of the sort, less entertaining, but far more useful for the motorist touring abroad. It contains scores of phrases in no fewer than eighteen languages, and is obtainable at 3d. from Shell-Mex House, London, W.C.2.

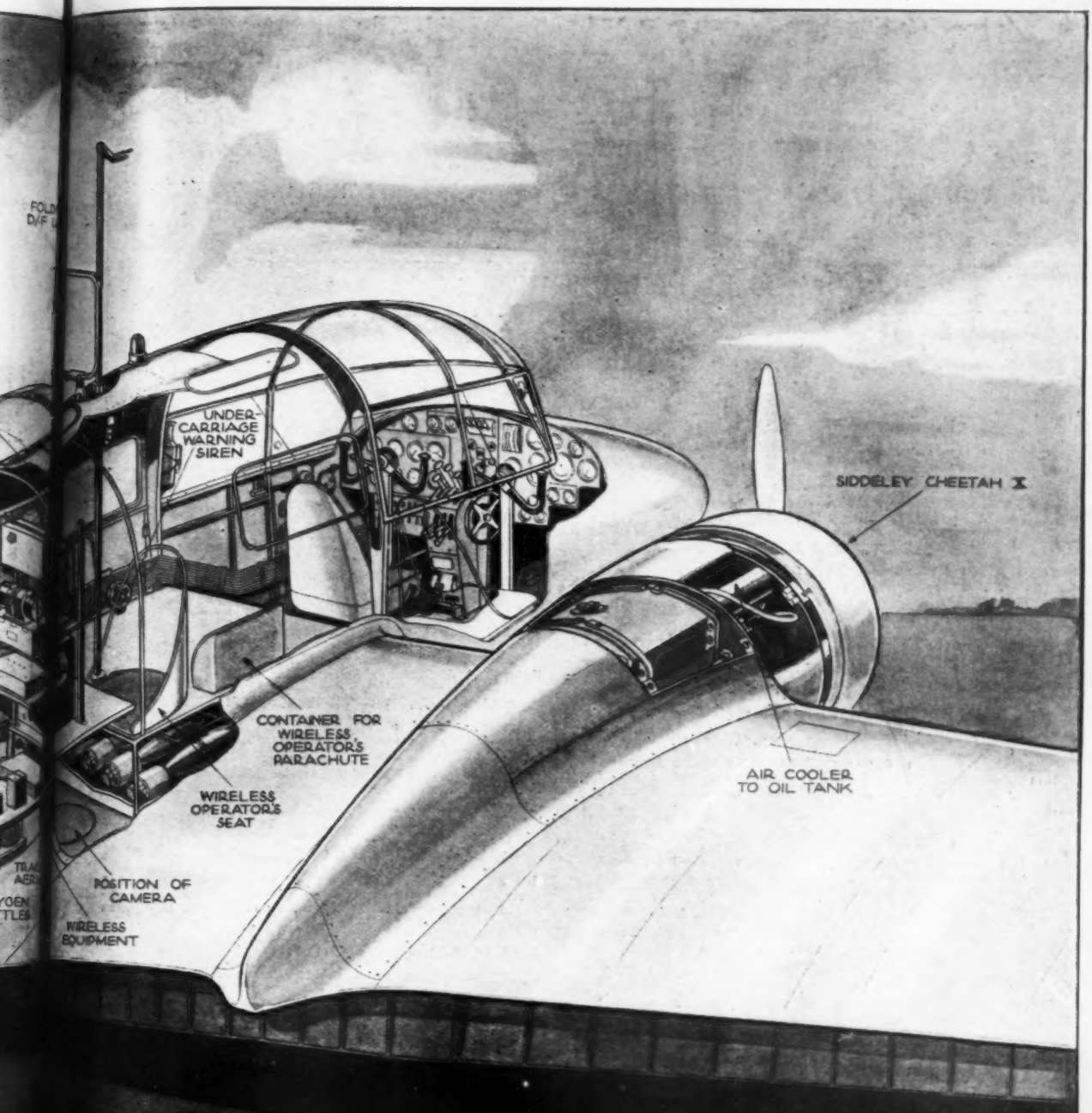
In case anyone is doubtful, the heading to this paragraph is Polish for "You have blown a cylinder gasket."

Fire Fighting Gear at Hatfield

A NEW 30-gallon Bromylene "Fire Froth" type B extinguisher was the main S.B.A.C. Show exhibit of the General Fire Appliance Company, Ltd., details of whose display were not available for our review last week. Every R.A.F. station at home and abroad, it is stated, now has one of these mobile extinguishers. For use in fumes and smoke of any sort, a lightweight oxygen-breathing apparatus, including two cylinders, harness, and rubber mask, was also to be seen. Crash equipment in wide variety is likewise a speciality of the firm.

THE R.A.F.'s NEW TWIN-ENGINED TRAINER





THE advent of high-performance multi-engined military machines with retractable undercarriage, flaps and variable pitch airscrews has necessitated the provision of suitable training aircraft embodying similar refinements and reproducing the handling characteristics of higher-powered models. Such a trainer is the Airspeed Oxford, adopted as a standard Service type and shown in this specially prepared *Flight* drawing. Provision is made for flying instruction, bombing and gunnery practice. Fitted with two Siddeley Cheetah X engines the Oxford is capable of 195 m.p.h. It is a direct development of the Envoy civil transport but has a re-designed nose to permit dual control and a number of other points of difference. An exterior photograph appears on page 29.

(*Flight* Copyright.)

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS

THE KING'S HENDON DISPLAY MESSAGE

THE King sent the following message to the Secretary of State for Air following the R.A.F. Display at Hendon on Saturday:

"I heartily congratulate all ranks of the R.A.F. on the splendid demonstration of flying given at the Coronation Display at Hendon to-day. During my long and highly-prized association with the R.A.F. I have attended many displays, but none that has testified more clearly to the efficiency and organising ability of the Service.

"I appreciate the courage and determination with which the Royal Air Force are meeting the heavy demands made upon them. I look forward to seeing something of their daily work from time to time and in the meanwhile the Queen and I send to all ranks our best wishes for their welfare."

HONOUR FOR SIR H. DOWDING

At Hendon on Saturday the King conferred the G.C.V.O. on Air Chief Marshal Sir Hugh Dowding, Chairman of the Display.

FORMATION OF A SQUADRON

No. 77 (Bomber) Squadron formed at Finningley on June 14 and will move to Honington on July 7.

MOVES OF SQUADRONS

No. 102 (Bomber) Squadron will move from Finningley to Honington by July 7.

No. 233 (G.R.) Squadron will remain at Upper Heyford until it moves to Thornaby on July 9

GRANT OF PERMANENT COMMISSIONS

The undermentioned medical officers have been selected for permanent commissions:

Flight Lieuts. John Cameron Blair, M.B., Ch.B., Lawrence Edwin Albyn Dearberg, M.R.C.S., L.R.C.P., Robert Sydney Baxter McClean, M.B., Ch.B., and David James Sheehan, M.R.C.S., L.R.C.P.

MOVES OF F.T. SCHOOLS

The R.A.F. Station, Brize Norton, Carterton, Oxon, will be placed under the command of the A.O.C.-in-C., Training Command, in No. 23 (Training) Group, with effect from August 16. No. 2 Flying Training School will move from Digby to Brize Norton. The move is to be completed by September 20.

No. 3 Flying Training School will move from Grantham to South Cerney. The move is to be completed by August 16.

ENTRANCE TO R.A.F. STAFF COLLEGE

The following officers have been selected for the 16th course at the R.A.F. Staff College, beginning January, 1938:—

Sqn. Ldrs. The Earl of Bandon, G. Bartholomew, G. B. Beardsworth, G. M. Buxton, C. S. Cadell, M. G. Cheshire, J. M. Cohu, R. Costa, T. C. Dickens, A. W. B. McDonald, F. E. Nuttall, F. R. D. Swain, J. B. M. Wallis, A. H. Wheeler, B. C. Yarde; Flt. Lts. J. E. M. Bainbridge, E. H. Bellairs, F. J. St. G. Braithwaite, H. Broadhurst, H. J. Butler (Equipment Branch), B. A. Casey, A. R. Combe, J. C. Cunningham, A. E. Dark, H. P. Fraser, E. C. Hudleston, A. W. Hunt, D. W. Lane, J. R. Mutch, M. G. Philpott, H. V. Satterly, J. N. T. Stephenson, R. C. Storrar (Equipment Branch), J. E. V. Tysack (Equipment Branch), F. R. Worthington; F/O. H. A. Sudbury (Equipment Branch)

No. 3 FLYING TRAINING SCHOOL

The undermentioned officers and airmen have been awarded special assessments on completion of a course of flying training at No. 3 Flying Training School, Grantham:—

Distinguished Pass

A.P/O.s R. H. Hain and E. A. Warfield, A./Sergts. Cooke, C. A., Weightman, J. B., and Williamson, F.

No. 4 FLYING TRAINING SCHOOL

The undermentioned airmen have been awarded special assessments on completion of a course of flying training at No. 4 Flying Training School, Abu Sueir:—

Special Distinction

A./Sergt. Tebbs, A. J.

Distinguished Pass

A./Sergts. Sutton, J. C. K., and Dawe, G. E.

No. 8 FLYING TRAINING SCHOOL

The undermentioned officers have been awarded special assessments on completion of a course of flying training at No. 8 Flying Training School, Montrose:—

Special Distinction

A.P/Os M. O. Scott and H. D. Green.

Distinguished Pass

A.P/Os C. E. A. Garton and P. H. M. S. Hunt.

No. 10 FLYING TRAINING SCHOOL

The undermentioned officers and airmen have been awarded special assessments on completion of a course of flying training at No. 10 Flying Training School, Tern Hill:

Special Distinction

A.P/O. A. H. McLaren.

Distinguished Pass

A.P/Os K. F. Arnold, P. H. Jackson and M. T. St. J. Pattle; A/Sergts. Everest, F. B., and Wood, D. J.

WIRELESS OPERATOR MECHANICS

It has been decided to reduce the qualifying period of service in the trade of wireless operator for the selection of airmen for conversion to wireless operator mechanic from three years to eighteen months.

FORMATION OF STATION HEADQUARTERS

A station headquarters will form at Digby on August 20 and will take over executive command with effect from September 20, on which date the station will be transferred to the Fighter Command and placed in No. 12 (Fighter) Group.

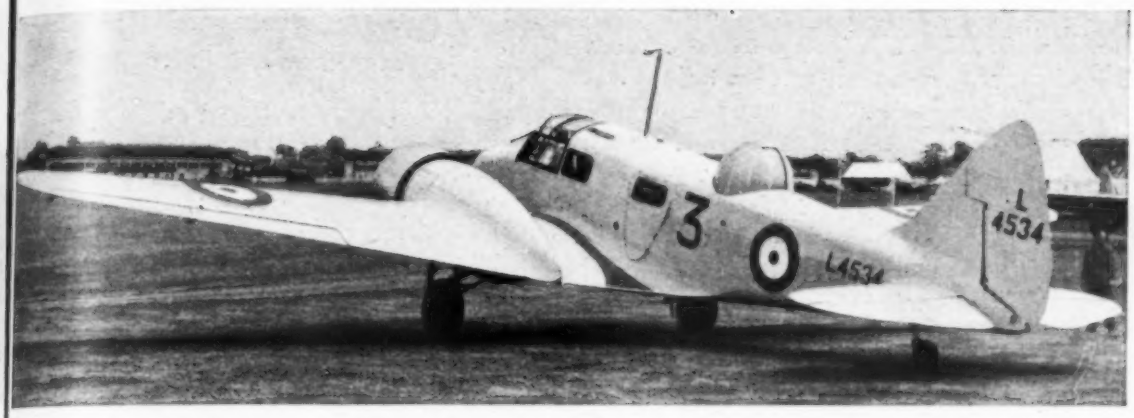
A station headquarters will form at Thorney Island, Emsworth, Hants, on August 30, on which date the station will be placed under the command of the A.O.C.-in-C., Coastal Command, in No. 16 (Reconnaissance) Group.

ROYAL AIR FORCE VOLUNTEER RESERVE

The Air Ministry announces that arrangements have been completed for the entry of personnel for training as pilots at aerodromes at Castle Bromwich, Redhill and Shoreham (Sussex) in the recently created Royal Air Force Volunteer Reserve, and applications are invited immediately from candidates resident in the districts served by those centres, namely, Birmingham, London and Brighton respectively. Vacancies also exist for training in the Bristol, Coventry, Glasgow, Hull, Leicester, Northampton, Perth, Reading and Southampton districts. The London centres at Hanworth, Hatfield and White Waltham are at present full, but intending candidates should nevertheless lodge their applications forthwith.

Candidates must be between their eighteenth and twenty-fifth birthdays and have had an education approximately up to the standard of the School Certificate. Applications should be sent to the Superintendent of Reserve, Royal Air Force, Hendon, The Hyde, N.W.9.

Selected candidates will be enlisted as airman pilots with the rank of sergeant; later they will have opportunities of promotion to commissioned rank, on merit. The initial period of service will be five years and pilots will have the opportunity of extending their



FOR MULTI-ENGINE TRAINING : The Oxford, a military development of the Airspeed Envoy, made its bow to the public at Hendon on Saturday. It provides for general training in the flying of the larger types of aircraft, in gunnery, in bombing, photography and other duties. Its interior equipment is shown in a special cut-away drawing on pages 26 and 27. (*Flight* photograph.)

service at the end of that period. Provided they carry out the training required of them and reach the required standard of proficiency, pilots will receive a retaining fee of £25 a year. Pay and allowances will be given for periods of continuous training and an allowance to cover out-of-pocket expenses incurred in training at other times. Travelling expenses will be refunded.

A CHANGE OF NAME

No. 1 Coast Artillery Co-operation Flight was renamed No. 1 Coast Co-operation Unit with effect from June 1.

PROMOTION TO THE ACTING RANK OF FLIGHT LIEUTENANT

The Air Council have had under consideration the filling of the large number of flight commander posts in service squadrons under the expansion programme and have decided to adopt the following procedure when such flights are commanded by officers too junior to be affected by the measure of accelerated promotion promulgated in A.M.O.A.88/36.

A flying officer who has completed at least one year's service from the effective date of promotion to that rank and is appointed to command a flight in a flight commander vacancy in the establishment of the squadron may be granted the acting rank of flight lieutenant, with pay at the rate of 19s. 2d. a day, with effect from the date of appointment and whilst in command of the flight. Acting rank will not count for seniority or service in the substantive rank of flight lieutenant and will not be granted in respect of any period prior to the date of this order. The selection of officers to command flights will be at the discretion of C.Os.

THE INDIAN AIR FORCE

The Secretary of State for India has approved the scheme for the secondment of Indian Commissioned Officers of the Indian Army to the Indian Air Force. The object of the secondment is to produce a reserve of pilots who are also trained as Army officers and to disseminate within the Army a knowledge of the work of the Indian Air Force. Seconded Indian commissioned officers must have a minimum of four years' and not more than six years' commissioned service in the regular Indian forces. The period of secondment will be four years, the first year to be spent in preliminary training.

Officers will be granted temporary commissions in the General Duties Branch of the Indian Air Force as Flying Officers and will take rank and command accordingly (with the honorary rank corresponding to any relatively higher rank held). Officers during their period of seconded service will receive the Indian Air Force rates of pay and allowance of their Indian Air Force substantive ranks.

Seconded officers will wear uniform of their corps or regiments, with Indian Air Force "wings" on service dress, as soon as they have qualified as pilots.

ABSENCE FROM QUARTERS

It has been decided to modify the rules regarding the absence of airmen from their quarters (at home) and the conditions attaching to permanent sleeping-out passes.

(i) Airmen not below the rank of sergeant (except airmen pilots who have not completed one year's service after mustering as such on completion of flying training) may, without special permission, be allowed to leave camp after duty on any day of the week and remain out of camp until next required for duty.

(ii) A permanent pass may be granted to an airman (other than an airman who has not completed one year's service with "V.G." character after reaching the age of eighteen years, an apprentice or a boy entrant) from after duty until 0100 hours or to any specified hour up to the first parade on the next day.

(iii) Airmen granted permanent passes to sleep out of camp will not be required to remain in their lodgings or quarters after tattoo.

MAINTENANCE OF AERODROME SURFACES

Considerable damage is being done to the grass surface of many aerodromes owing to harsh use of aircraft brakes particularly when turning at slow speeds. Except in emergency it is unnecessary to lock one wheel of an aircraft in order to turn. Pilots are to exercise all possible care in this manœuvre and any other which may tend to damage grass. At training establishments, particular instruction is to be given to pupil pilots.

FLYING ACCIDENTS

The Air Ministry regrets to announce the following accidents:

A.P/O. Robert Henry Rice was killed at Almaza on June 17 as a result of falling from an aircraft in flight. He was a passenger in the aircraft, which belonged to No. 4 Flying Training School, Abu Sueir.

Sergt. William Hinson lost his life in an accident which occurred at Leeds Village, near Maidstone, on June 18, to an aircraft of No. 48 (General Reconnaissance) Squadron, Manston. Sergt. Hinson was the pilot and sole occupant of the aircraft.

The Ministry also regrets to announce that P/O. James Grahame Thompson lost his life in an accident which occurred off Eastney, Portsmouth, on June 17 to an aircraft of the School of Naval Co-operation, Lee-on-the-Solent. P/O. Thompson was the sole occupant of the aircraft.

ROYAL AIR FORCE GAZETTE

London Gazette, June 16, 1937

General Duties Branch

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of May 31, 1937:—J. R. Appleton, G. G. Avis, D. F. Beardon, H. R. Bewlay, F. E. W. Birchfield, R. C. Bisset, E. W. Bundock, M. K. Carswell, W. H. Coleman, J. F. R. Collis, R. M. J. Cowles, D. H. Edwards, C. S. Harley, W. J. Helliwell, W. S. Herd, D. S. Hill, L. C. R. Hill, J. F. Hyde, I. S. Jameson, R. A. C. Kent, J. I. Kilmartin, C. S. F. Lea, L. H. Leader, P. H. Lee, J. N. Leyden, J. B. H. Nicholas, J. A. A. Read, M. R. Skeet, J. H. C. Speirs, J. R. Taylor, G. E. Walker, R. H. Wilding, D. L. Wolfe, P. H. Woodruff.

Cdr. R. St. A. Malleson, A.F.C., R.N., is re-attached to the R.A.F. as a Wing Commander with effect from June 1, and with seniority January 1, 1936; Flt. Lt. S. E. MacKenzie is seconded for service as Aide-de-Camp to the Governor of Northern Rhodesia (June 5).

The following Pilot Officers on probation are confirmed in their appointments (May 21):—J. E. Dutton, R. J. Kemsley, J. G. Priest, E. N. Rooms, A.F.M., F. L. Sayers, C. E. Sims, C. E. Slee, R. W. Stewart.

The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers on the dates stated:—E. W. Mitchell (April 24); A. W. Oldroyd and E. W. Sykes (May 4); M. H. Brown and K. R. Russell (May 11); H. R. Bickerstaff, A. A. Devany, R. S. Illingworth, and T. G. Robertson (May 18).

Flt. Lt. A. P. C. Hannay, M.C., Capt., The Cameron Highlanders, is promoted to the rank of Squadron Leader with effect from May 6.

The following Flying Officers are promoted to the rank of Flight

Lieutenant on the dates stated:—A. H. Jarand and G. A. V. Knyvett (June 1); J. H. G. Sarli (June 2).

Flt. Lt. V. W. Glasheen is transferred to the Reserve, Class A (June 12).

Acting Pilot Officer on probation H. P. Blundell resigns his short service commission (June 11).

The short service commission of Acting Pilot Officer on probation J. R. Cruttwell is terminated on cessation of duty (June 8).

P/O. J. L. Crisp is dismissed the Service by sentence of General Court-martial (June 8).

Commissioned Engineer Officers

The following Warrant Officers are granted permanent commissions as Flying Officers on probation with effect from June 3 and with seniority of May 18, 1937:—W. Squires, D. J. Day, F. F. S. Mattingley, W. McCarthy, H. E. Brushwood, A. Clifton, R. Herrick, W. J. Scrivener.

Commissioned Signals Officers

The following Warrant Officers are granted permanent commissions as Flying Officers on probation with effect from May 31 and with seniority of May 18, 1937:—E. W. Long, A. D. Rutherford, D.F.M.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers
General Duties Branch

R. S. Martin is granted a commission as Flight Lieutenant in Class C with effect from June 1 and with seniority of November 27, 1932; P/O. L. Jones is transferred from Class AA to Class C (May 31); F/O. J. R. Mathews relinquishes his commission on completion of service (July 18, 1936).

AUXILIARY AIR FORCE

General Duties Branch

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—F. A. White is granted a commission as Pilot Officer (May 5).

No. 601 (COUNTY OF LONDON) (FIGHTER) SQUADRON.—The following Pilot Officers are promoted to the rank of Flying Officer (April 14):—The Hon. M. Aitken; W. P. Clyde.

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—E. C. Deanesly is granted a commission as Pilot Officer (March 18); P/O. D. R. Scott is promoted to the rank of Flying Officer (April 25).

No. 610 (COUNTY OF CHESTER) (BOMBER) SQUADRON.—W. H. C. Warner is granted a commission as Pilot Officer (May 7).

Equipment Branch

The following are granted commissions as Flight Lieutenants on the dates stated, for duty with Balloon Barrage Squadrons:—F/O. R. A. Ford, R.A.F.O.; F/O. A. N. E. Hall, R.A.F.O.; F/O. J. C. Walker (R.A.F., Retd.); F/O. R. V. Weeks (R.A.F., Red.); F/O. D. W. Morrish, R.A.F.O. (February 8); F/O. J. Evason (R.A.F., Retd.) (April 8).

Medical Branch

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—J. H. Attwood, M.B., B.S., M.R.C.S., L.R.C.P., D.A., is granted a commission as Flying Officer (May 7). (Substituted for notification in *Gazette* of June 8.)

Chaplains Branch

No. 605 (COUNTY OF WARWICK) (BOMBER) SQUADRON.—The Rev. R. F. S. McKelvie, M.A., D.D., is appointed Chaplain, with the relative rank of Squadron Leader (February 12).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commanders.—J. Leacroft, M.C., to R.A.F. Station, Thornaby; to command, 1.6.37. S. L. Quine, M.C., to No. 215 (B) Squadron, Driffield; to command, 21.5.37. H. K. Thorold, D.S.C., D.F.C., A.F.C., to R.A.F. Station, Mildenhall; to command. E. A. Fawcus, to Headquarters, Coastal Command, Lee-on-the-Solent; for Equipment (Engineer) Staff duties, 16.5.37. E. W. Broadberry, M.C., to Headquarters, No. 24 (Training) Group, Halton; for Air Staff Duties, 1.6.37. R. St. H. Clarke, A.F.C., to Headquarters, Armament Group, Eastchurch; for Air Staff duties, 1.6.37.

Squadron Leaders.—L. F. Pendred, M.B.E., D.F.C., to Directorate of Training Dept. of A.M.P., Air Ministry, vice Wing Cdr. E. I. Bussell, 24.5.37. W. M. M. Hurley, to Headquarters, No. 24 (Training) Group, Halton; for Air Staff duties, 15.5.37. W. J. Seward, to No. 2 Anti-Aircraft Co-operation Unit, Lee-on-the Solent; to command, 24.5.37. H. J. Walker, to No. 214 (Bomber) Squadron, Feltwell; for flying duties, 31.5.37. F. R. Wynne, M.B.E., to R.A.F. Station, Cranfield; to command, 1.6.37. N. S. Allinson, to No. 269 (General Reconnaissance) Squadron, Abbotsinch; to command, 22.5.37. J. B. M. Wallis, to No. 233 (General Reconnaissance) Squadron, Boscombe Down; to command, 22.5.37. K. H. Riversdale-Elliot, D.S.O., to Central Flying School, Upavon; for Administrative duties, 29.5.37. H. M. Groves, to D. of T., Dept. of A.M.P., Air Ministry, vice Flt. Lt. J. Marsden, 1.6.37. P. S. Blockey, to No. 80 (F) Squadron, Debden; to command, 17.5.37. G. Bartholomew, to No. 113 (B) Squadron, Upper Heyford; to command, 27.5.37. L. T. Pankhurst, to Headquarters, No. 12 (F) Group, Hucknall; for Air Staff duties, 31.5.37. E. H. Richardson, to No. 149 (Bomber) Squadron), Mildenhall; for flying duties, 31.5.37. H. M. S. Wright, to Directorate of Staff Duties, Air Ministry, 7.6.37. I. McL. Cameron, to No. 110 (Bomber) Squadron, Waddington; to command, 7.6.37. H. E. Nowell, to Headquarters, No. 22 (Army Co-operation) Group, South Farnborough; for Personnel Staff duties, 1.6.37. G. V. Tuttle, to No. 105 (Bomber) Squadron, Harwell; to command, 7.6.37. H. A. Constantine, to No. 214 (Bomber) Squadron, Feltwell; for flying duties, 2.6.37.

Flight Lieutenants.—D. Michell, to Superintendent of the Reserve, Hendon, 29.5.37. R. H. Shaw, to Air Observers School, North Coates Fitties, 29.5.37. W. A. J. Satchell, to No. 204 (Flying Boat) Squadron, Mount Batten, 5.6.37. D. Addenbrooke, to No. 40 (Bomber) Squadron, Abingdon, 1.6.37. D. Cooke, to No. 65 (Fighter) Squadron, Hornchurch, 26.5.37. D. G. Lewis, to No. 40 (Bomber) Squadron, Abingdon, 1.6.37. A. M. Watts-Read, to R.A.F. Station, Calshot, 22.5.37. J. Marsden, to No. 24 (Comm.) Squadron, Hendon, 1.6.37. A. F. R. Bennett, to No. 24 (Comm.) Squadron, Hendon, 26.5.37. A. H. Allen, to R.A.F. Station, Cardington, 24.5.37. D. G. Morris, to Headquarters, No 23 (Training) Group, Grantham, 20.5.37. R. H. Young, to Station Flight, Abingdon, 18.5.37. E. A. Jones, to No. 11 Flying Training School, Wittering, 18.5.37. R. H. E. Emson, to No. 6 Armament Training Camp, Woodsford, 25.5.37.

Flying Officers.—T. B. Morton, to No. 101 (B) Squadron, Bicester, 1.6.37. A. Green, to No. 30 (B.B.) Group, London, 1.6.37. G. J. Wright, to School of Air Navigation, Manston, 17.5.37. A. A. McMath, to No. 9 Flying Training School, Thornaby, 18.5.37. C. N. Fleming, to R.A.F. College, Cranwell, 18.5.37. B. J. Paul, to R.A.F. Depot, Aboukir, Egypt, 5.5.37. D. F. Balsdon, to No. 6 Armament Training Camp, Woodsford, 31.5.37. M. R. Baillon, to No. 821 (F.S.R.) Squadron, 22.5.37.

Pilot Officers.—S. Hook, to No. 15 (B) Squadron, Abingdon, 1.6.37. A. S. B. Blomfield, to No. 5 (A.C.) Squadron, Chaklala, India, 25.5.37. P. N. Jennings, to No. 31 (A.C.) Squadron, Karachi, India, 25.5.37. E. N. Rooms, A.F.M., to Experimental Section, Royal Aircraft Establishment, South Farnborough, 10.5.37. P. H. Richmond, to R.A.F. Station, Mount Batten, 11.5.37. T. G. Tideman, to R.A.F. Station, Andover, 20.5.37. F. M. Thomas, to R.A.F. Station, Mildenhall, 10.5.37. C. A. Turner, C. A. Butler, F. O. Thresher, L. F. Cooper, L. W. Lowden and G. P. Robinson, to No. 233 (General Reconnaissance) Squadron, Boscombe Down, 22.5.37. P. H. Alington, M. H. Cox, R. W. Gautrey, R. C. O. Lovelock, F. Phillips, J. St. J. Thomson, and A. G. Wincott, to R.A.F. Station, Calshot, 22.5.37. J. H. Chaplin, D. Ford, J. S. Kendrick, and P. R. Woodward, to No. 201 (Flying Boat) Squadron, Calshot, 4.6.37. S. R. Gibbs, to No. 204 (Flying Boat) Squadron, Mount Batten, 5.6.37. F. E. R. King, to No. 209 (Flying Boat) Squadron, Felixstowe, 7.6.37. E. J. S. Jones, to No. 228 (Flying Boat) Squadron, Pembroke Dock, 7.6.37. S. C. Bastin, to No. 11 Flying Training School, Wittering, 10.5.37. R. W. Christmas, to No. 6 Flying Training School, Netheravon, 10.5.37. L. Fox, to No. 240 (Flying Boat) Squadron, Calshot, 10.5.37. L. Jobbins, to No. 6 Flying Training School, Netheravon, 10.5.37. L. Gregory, to No. 5 Flying Training School, Sealand, 10.5.37. H. C. Marshall, to No. 8 Flying Training School, Montrose, 10.5.37. J. W. Monk, to No. 10 Flying Training School, Tern Hill, 10.5.37. J. E. Pebody, to Experimental Establishment, Royal Aircraft Establishment, 10.5.37. H. Z. Foreman, to No. 1 Flying Training School, Leuchars, 10.5.37. H. Stringer, to No. 7 Flying Training School, Peterborough, 24.5.37. C. H. Heber Percy, J. A. C. Karran, J. G. Thompson, and D. V. W. Francis, to R.A.F. Station, Gosport, 21.5.37. E. L. Wurtele, to No. 823 (Torpedo Spotter Reconnaissance) Squadron, 27.5.37.

Acting Pilot Officer.—P. L. Dakeyne, to No. 7 Flying Training School, Peterborough, 20.5.37.

Equipment Branch

Wing Commander.—J. A. Stone, to Headquarters, Training Command, Market Drayton; for Equipment (Staff) duties, 31.5.37.

Squadron Leader.—S. Bingham, to R.A.F. Station, Tern Hill; for Equipment duties, 3.6.37.

Flight Lieutenant.—J. E. V. Tyzack, to No. 1 Equipment Depot, Kidbrooke, 1.6.37.

Accountant Branch

Flight Lieutenant.—V. Matveieff, to R.A.F. Station, Cranfield, 1.6.37.

Pilot Officer.—P. W. Hill, to Home Aircraft Depot, Henlow, 4.6.37.

Medical Branch

Flight Lieutenant.—T. J. M. Gregg, to No. 4 Flying Training School, Abu Sueir, Egypt, 3.5.37.

Commissioned Engineer Officers

Flying Officers.—The undermentioned are posted to the Units shown, on appointment to permanent commissions, on probation with effect from 18.5.37:—I. F. Chambers, F. J. A. Willis, to No. 3 Flying Training School, Grantham. P. G. G. Begrie, W. Webster, to No. 8 Flying Training School, Montrose. H. Cadman, A.F.M., M.S.M., C. L. Trevithick, to No. 10 Flying Training School, Tern Hill.

COMMERCIAL AVIATION

ATLANTIC DEPOT: Two views of the Friesenland, the new D.L.H. catapult ship which, as explained in the description in last week's issue, will be stationed at the Azores. The photograph on the right also shows the Jumo-engined Blohm and Voss seaplane, *Nordwind*, which is interesting as a possible transatlantic type, being hoisted on board.

THE WEEK AT CROYDON

Perfumed Ponds : New Services : Real Air Travel : Manners and Modes : G.P.O. Hustle

MAYBE aero engines, like humans, feel a bit contrary on Monday mornings, but, anyway, a dapper little French amphibian just roared and roared outside my office window last Monday morning. It looked and sounded efficient enough to be able to do without quite so much running up, but perhaps the pilot was right. I am told that the machine belongs to Mr. Pierre Coty, the Scent Satrap ("Perfume King" has been used so often), and maybe his private swimming pool is what we would call a large lake so that his amphibian can come down there. Perhaps even the water is scented.

Some hon. and gallant gent has been trying to stop flying over London after midnight, and because nobody could swear the machine was British he seems to have assumed it was foreign. Much more likely to be one of the British machines taking joy-riders to see the lights o' London. Anyway, with services in and out practically all night as well as all day, somebody British or foreign will be flying over Westminster at night one of these days.

Air France, I see, has a new service scheduled for July 4 from London to the Riviera. Passengers will leave Croydon at 6.30 p.m. and spend the night in Paris, where accommodation will be free. Next day, at 7 a.m., the journey will recommence, and arrivals at Marseilles and Cannes will be at 6.15 and 7.15 p.m. respectively. There will be two daily return services, leaving Cannes at 8.30 a.m. and 12.15 p.m. and arriving Croydon at 3.30 p.m. and 6.30 p.m. The service is one that should certainly earn its keep. Another new air link due to start to-day is from Stockholm to Moscow, with connections to and from London. The Stockholm-Moscow sector will be operated by A.B. Aerotransport co-operating with Aeroflot. The outward trip from London takes thirty-six hours with a night's stop at Stockholm, but Moscow-London can be flown in a day.

Some unfortunate Englishmen flying around had camera trouble in a Continental city, I hear. Air transport companies don't get these troubles because they have learned how important it is to obey other people's rules. All passengers' cameras are sealed up in a special bag for the purpose, which is kept by the company. Knowing the rules, and keeping them, saves black looks from normally polite and smiling police abroad, saves delays and possible imprisonment and fines, and saves one making the acquaintance of the secret police. One even avoids the ordinary police over here and our secret ones are probably pretty fearsome fellows—but they're so secret, luckily, that they're not easily encountered.

"Cheap Days"

The K.L.M. cheap "one-day" return tickets (London Rotterdam £7 10s. return instead of £9, and London-Amsterdam £8 5s. instead of £9 18s.) have attracted quite a lot of business, for they appeal especially to business men with irregular visits to pay in the other country. Of course, there are the regular season ticket holders, especially Dutch business men, who fly to and from London in the day once or twice a week.

There is a big all-round increase in air traffic and one day recently the number of Continental passengers in and out of Croydon exceeded the same day's total for Harwich by a handsome margin. Air freight, too, is on the up-grade, but as the essence of the contract is speed and Customs formalities are old-fashioned and over-elaborate for the new form of transport, a danger exists that the speed with

Commercial Aviation

which goods come to this country by air will be of little or no value unless delays on the ground can be obviated.

Average folk really have not got the hang of the air travel idea even yet. On Sunday I met a prominent air transport director from Holland who flew over for the Hendon Display on Saturday morning. Faced with a British Sunday and the prospect of creeping slowly to one of our gay seaside resorts along crowded roads, he had decided on a simpler way. He took the 9.30 a.m. K.L.M. machine, which landed him in Rotterdam in a short hour and a half. This city is fairly near Scheveningen, the seaside resort, where he spent the day with his family, and left for London again after dinner at 10.45 p.m., reaching Croydon at midnight in order to attend the S.B.A.C. Show on Monday and Tuesday. If somebody abroad says "Come and have a cup of tea this afternoon," it is quite possible to nip across to France or Holland and get back to London the same evening for dinner. This is a facility of which humanity is slow to take advantage, because the Victorian idea still vaguely exists that a visit to the Continent is a tremendous adventure and a devilish enterprising thing [and also because humanity cannot usually afford £6 10s. for a cup of tea.—ED.].

Stewards and stewardesses recognise a difference in the "atmosphere" of machines at various times of day—by which I do not mean the sort you can cut with a knife at your night club and take a cube home as a souvenir, for ventilation on modern machines is beyond reproach. Early-morning—very early-morning—passengers are sluggish and need coffee; midday ones are alert and interested in the journey; afternoon travellers are mostly less alert and inclined towards a post-prandial snooze. Night passengers are of two kinds—the 10.0 p.m. lot, who want to see the coastal lights and all the attractions of night flying, who eat, drink and converse; and the very late lot arriving at midnight, who just want a darkened cabin and sleep.

By the way, a little bird, in a postman's peaked cap, informs me that the G.P.O. road transport people, who wanted to leave some air mails lying around at Croydon for a couple or three hours, only did so for a week and then put a van on which met the machine. Generally speaking, the G.P.O. link-up with Croydon is excellent and wastes no time. Mail takes a certain amount of sorting, yet the other evening I saw the blue mail van leave here with the mails, a big load from a service on which the passengers were not yet through Customs. A. VIATOR.

More Paris Services

TO-DAY British Airways' new Paris time-table, involving thirty-nine weekly services, comes into force. The additional services will be operated on the "fast" schedule with Lockheed Electras, and, in all, there will be six daily services from Monday to Friday, five on Saturday and four on Sunday.

A.N.D. Amendments

A *Notice to Owners and Ground Engineers* explains that A.N.D.13 has been amended on two points. Transport machines, capable of carrying ten or more persons, including the crew, must have an artificial horizon and a directional gyro. Other transport machines flying outside a radius of twenty miles from the point of departure must carry, in addition to a watch, maps and compass, an artificial horizon or longitudinal incline indicator and a directional gyro or turn indicator.

A New Dewoitine

THE Societé Nationale des Constructions Aéronautiques du Midi (the southern group of the nationalised French aircraft industry) which embraces the former Societé Aeronautique Française and retains M. Dewoitine as its moving spirit, has just produced a new prototype for Air France, the Dewoitine 620 or *Pacifique*.

It is a thirty-seater derived from the Dewoitine 333 and 338. Its performance may induce the Air Ministry to take it up also as a troop carrier, as it has a remarkably high payload for low consumption and a high cruising speed. Its top speed at 6,000ft. is 220 m.p.h. For a total all-up weight of about 26,000 lb. it has a payload of over 8,000 lb. Like the 338, it is made entirely of metal and is equipped with slotted flaps, retractable undercarriage and v.p. airscrews. Its three engines are Gnome Rhône K.14s of 880 h.p. each. The machine can maintain height fully loaded on two engines at 6,000ft.

Weston's First Year

THE value of the short-distance ferry service as a preliminary venture in airport and air transport operation is amply proved by the traffic figures for Western Airways' first year's work from Weston-super-Mare. The general public can more easily be encouraged to fly if the journey is comparatively short, if a real saving of time is involved, and if the fare is in shillings rather than pounds. Later on, as people learn to use the air and become accustomed to such travel, they will automatically support more ambitious projects. At Weston the general public, whether prospective passengers or not, are encouraged to "come and look."

During this first year 25,158 passengers were handled at Weston, and of these 23,837 were carried by Western Airways—in comparison with 4,093 for the previous twelve months, when Mr. Norman Edgar was operating the Cardiff ferry from Bristol. Two D.H. 89s (Rapides) have recently been added to the W.A. fleet and Chance night lighting has now been installed at the airport.

More and More

THE steady increase in the number of students attending Mr. Martin's Imperial School of Navigation has necessitated a removal to larger and more convenient premises at 41, Arundel Gardens, W.11. The telephone number (Park 6288) remains unaltered.

The Southall Gasholder

NOW that summer is here, with long evenings and better visibility generally, pilots will be relieved to know that the Southall gasholder has been fitted out with obstruction lights. However, they will be extremely useful in the winter, and have been needed for many years, during which we, among many others, have stressed the possible dangers of this large unlighted obstruction.

Atlantic Test

IT has now been officially announced that, all being well, *Caledonia* will leave Rynanna, in the Shannon Estuary, for Botwood, Newfoundland, in the evening of July 5. The trip should take about sixteen hours and the boat will go on to Montreal and New York after a short stop at Botwood. The whole distance is a matter of 3,220 miles.

The New Lockheeds

BY now the first of the new ten-seater Lockheed 14s, eight of which have already been ordered by Northwest Airlines, seven by K.L.M., and four by Trans-Canada Airways, should have made its first test flights in the hands of Mr. Headle, who was over here to pass out British Airways' Electras earlier this year. Incidentally, the company has recently turned out its 100th Electra.

For German Scholars

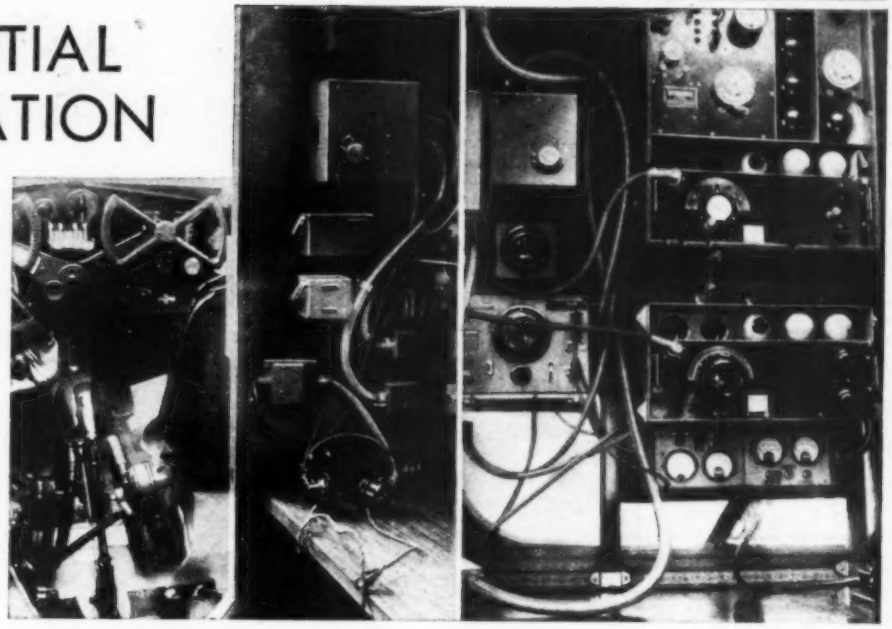
Grundlagen der Flugzengnavigation, by W. Immler. (R. Oldenbourg, München, 1, Schliessfoch 31.)

THOSE who can read German—and technical German is, for many reasons, more easily understandable than the colloquial kind of language used in novels—should find some interesting material in this book on advanced air navigation.

Starting from the usual "form of the earth" foundation, Prof. Immler builds up his sections in logical sequence, through normal navigation problems and the principle of the various instruments used in an aircraft, to advanced great circle work and astronomical navigation. The entire work is most profusely and clearly illustrated, and there is a selection of large-scale diagrams, covering the more intricate points in terrestrial and astronomical navigation, in loose form at the back of the book. The price in Germany is 12 Rm.—a reasonable figure enough for such an ambitious and carefully worked-out text-book.

ESSENTIAL DUPLICATION

Special Radio Equipment for the North Sea Service D.H. 86B : Independent Power Supplies



Two views of the interior of the Allied Airways' 86B, showing the disposition of the special equipment in "radio alcove" behind the control cabin. The picture on the right is actually the cabin wall continuation of that on the left, which shows the partition wall.

MORE than once *Flight* has stressed the need for virtual duplication of all the navigational and radio equipment in transport machines. We have not suggested that the radio equipment, for instance, should be duplicated piece by piece, but that failure of any item should always leave the crew with some means of carrying out a journey in safety.

When Allied Airways' new D.H. 86B goes over shortly—possibly this week—on its first Newcastle-Stavanger run, it will be equipped in a manner which should make it one of the safest machines in operation to-day. Not only are the leading edges and struts laid out with Dunlop Anticer equipment, the usual navigational instruments duplicated, and an electrically heated pitot head fitted, but the Standard radio equipment is such that no failure should leave the machine without very necessary D/F assistance.

The main two-way communication set is a Standard A.T.R.4 set, with a wave range of 550-1,100 metres, the power being supplied by a dual-voltage windmill-driven generator, the output of which is arranged also to charge the battery. In case of possible failure due to breakdown or icing-up arrangements have been made for the two-way equipment to be switched over to two rotary converters, one for transmission and the other for reception. The control box for this converter system is quite independent of that for the normal generator.

In addition to the A.T.R.4 equipment, a self-contained D/F receiver is installed, the receiver for which is an exact duplication of that for "communication." The aerial system for the R.C.8 visual type of D/F attachment consists of the usual rotatable loop working in conjunction with a short fixed aerial, which is quite separate from the normal three-wire fixed aerial used for short-range work when the trailing aerial has been wound in. This D/F receiver has its own rotary converter and can, of course, be used for ordinary reception if the A.T.R.4 receiver breaks down.

Since the most important use of an aircraft transmitter is that of providing signals so that ground stations may take bearings, the provision of self-contained D/F is in itself an insurance against transmitter failure, whilst, at the same time, enabling the crew, in this case, to take their own bearings from the various marine beacons along the North Sea coast.

The entire equipment is housed in a special compartment behind the control cabin. The usual means of communications will be by C.W. telegraphy, but it may be said that, with the same two-way equipment in Aberdeen Airways machines used on the Kirkwall run, telephony has been received very well in Norway.

On its first crossing the 86B will probably have on board, as radio technical adviser, Mr. H. M. Samuelson, of Smith's Aircraft Instruments, who has been in charge of this particular installation and who has demonstrated Smith's "Flying Laboratory" Dragon over most of Europe since this interesting machine made its first appearance.

Charter Comfort

BIRKETT AIR SERVICE, LTD., of Heston, tell us that they have added a D.H. Dragonfly, equipped with radio, to their charter fleet.

Pilots' Union

FOR several weeks there have been rumours of the impending or actual formation of a pilots' trade union. On Sunday the British Air Lines Pilots' Association, as the organisation is known, held its first meeting, during which it was decided that there should be a nation-wide ballot for the election of officers. A provisional committee was appointed to make the necessary arrangements, with Mr. Burslem as chairman, and Captain Rogers in charge of the investigation section.

It may be remembered that a society has already been formed (*Flight*, May 27) for the protection of the aircraft operators' interests. Presumably, these two associations, with those for radio operators and G.E.'s, will work together for the benefit of all and sundry. We understand that Imperials, at any rate, have given the Pilots' Association their private blessing. But what about the G.A.P.A.N.? Apparently, pilots feel that this organisation is concentrating more on technicalities than on domestic affairs.

Liverpool—Amsterdam

THE time-table for the K.L.M. Liverpool-Doncaster-Amsterdam service, which was restarted to-day, involves a daily departure (except on Sundays) from Liverpool at 10 a.m., and from Amsterdam at 2.30. There are useful connections over here by Railway Air Services and North-Eastern Airways, and Douglas D.C.2 machines will be used exclusively. On the same day North-Eastern Airways, incidentally, will be starting their new services between Doncaster and Manchester, and Hull and Grimsby.

Selling Air Transport

FULL marks must be given to Northern and Scottish Airways for the 1937 edition of their official guide, *Go By Air*. It is not often that we find an air transport company going so very far in a real effort to sell air travel to the uninitiated traveller.

It is, at once, an illustrated guide to Campbeltown, Islay, Skye, the Hebrides, the Isle of Man and Northern Ireland—with really well-written articles on each centre—and good piece of propaganda for Northern and Scottish. What other people think of it may be gathered from the amount of hotel and other support to be found therein.

Some Chastening Thoughts on Getting from A to B, Particularly from the Service Pilot's Point of View — and a Suggestion to Makers of Maps.

Flight photograph

By B. J. HURREN

IF the chief aim of an air force is to bomb it is clearly a safe rider that the bombing should be done in the required place. In other words, the first essential of a pilot is to be able to find his way from A to B.

One has only to think of the number of lost aircraft to realise that A to B may be a long journey. Add to this the very large number of cases (usually unreported) where pilots land to find out where they are, and B is seen to be a matter of doubt until the destination is actually reached.

The elusive B has been sought by famous and beginners alike—and often in vain. Crack pilot Merrill could fly the Atlantic; but, even over London, he could not find Croydon.

Then there is the mirth-making case of the naval officer flight commander who was trained in Egypt and served two commissions abroad before coming to Plymouth, homeward bound. He had to lead his flight of Flycatchers along the coast, and (believe it or not) he mistook the mouth of the Solent for Beaulieu River, and cheerfully flew on towards Belgium!

Again, there is the young enthusiast who has been flying for *five years* at an Essex flying club. He has just moved to a Sussex club because he can now fly confidently along the coast, whereas in Essex he never went farther than ten miles from the aerodrome for fear of losing his way!

Similar cases by the score may be quoted, and B becomes as attractive as a will-o'-the-wisp.

Perfection's Pair

How to find B depends on three things: compass, map, and luck. Compasses go wrong, maps are deceptive, and luck is a good thing to have with one, but cannot be relied on.

Incidentally, compasses are the sure shield and buckler of only a privileged few. It is said that in the combined Services there are only *two* top-notch navigators: one is a naval officer, so good that his navigation is more reliable than the Admiralty charts (he proved this off Madagascar and Labrador); the other is an Air Force officer who unhappily earns his pay in a comfortable ground job!

It would require the words of the super-experts to suggest compass improvements, but surely the time has come to inveigh against present maps. In current use everywhere are the four miles and ten miles to the inch maps, and only those who have lost their way in the air realise how deceptive these maps can be.

When one is lost it seems that the first thing to do is to try to spot a railway layout on the ground and locate this on the map. Simple as this sounds, it is possibly one of the most difficult achievements, as everyone who has tried it will testify.

Take the case of open country, as in the Fens or Lincolnshire. Even a cursory glance at the map will show the tyro that again and again layouts are repeated. One sees a small market town with rail lines running to the cardinal points, and there is nothing else by which it may be identified. After flying round this for a bit the pilot succumbs to his own suggestion that this is the place he seeks or can recognise—only to find that he has been deceived by the smallness of his map, which cannot reproduce exact layouts.

Smoke Screens

But the position is reduced to absurdity when in the vicinity of places like Birmingham, Manchester, or London. Here on even the clearest days smoke drift sets up an artificial fog. To attempt railway identification is to tilt at a windmill. In three minutes over the Birmingham district, flying at 180 m.p.h., a pilot covers Wolverhampton, Dudley, Smethwick, Walsall, West Bromwich, Oldbury, and a dozen smaller places—all of which have similar rail track layouts!

Manchester, home of rain, low clouds, and mist, is as bad; and the mightly industrial districts of Stockport, Altrincham, Salford, Wigan, Bolton, Rochdale (to mention the more predominant *map* sites) are in practice one long stretch of urban area where the tyro can be fully excused for losing his way.

Is it important to know which town is which? Certainly, for if the elusive B is, say, a magneto factory to be bombed at Dudley it is a waste of warfare to bomb the cycle works adjoining, at Wolverhampton.

It is this aspect of finding B which pulls up the thoughtful pilot with a jolt. It may be funny for the naval wallah to miss the Isle of Wight, it may be ludicrous that the Essex birdman moved to Sussex, but in time of war it is of paramount importance for pilots to get direct to B and do their level worst.

Counting rail heads and junctions as a desirable objective in warfare, one has to consider our pilots sent out—on the shortest possible notice—to find Continental towns just like Birmingham, Manchester, and London with no other

guide than a compass and a map—and that after a flight of, probably, several hundred miles. How many of to-day's active Service list would set off to-morrow with any degree of confidence to carry out such a programme?

Knowing the difficulties in England, on our own ground, of locating a camouflaged petrol dump at, let us say, Longeaton, near Derby, Nottingham and Loughborough, what prospects of success lie in store for a raid to the Continent?

Now it would obviously create grey hairs in Whitehall to suggest our Air Force should fly around the Continent on a look-see. But it is not beyond the scope of immediate practice to have pilots trained in map-reading on new lines.

Map-reading

This may be somewhat revolutionary, but any instructor will admit that very rapidly pupils learn to know their home country. Usually there is a railway, a river, a canal, or some conspicuous landmark to which the fledglings can turn for help when lost.

But suppose pilots being trained in map-reading were sent off to distant aerodromes? Suppose the young gentlemen at Woodley were sent to Cramlington, and the boys from Hucknall packed off to Bristol? Would not some interchange system such as this develop acutely a pilot's sense of converting the ground plan into his map and *vice versa*?

Naturally, in a very short time pupils would learn the ropes, but if the maps supplied them bore no names but merely numbers the value of map training in the air would be considerably enhanced.

The immediate objection to this is that the small scale of the four miles and ten miles maps prevent any accurate identification of rail track layouts, whilst to handle a map of larger scale would be unwieldy and the converse of conditions to be expected in map-reading one's way over the Continent.

There seems a sound solution to this. Taking an ordinary four miles to an inch map, it is suggested that important places should have enlarged plans at the edge of the map. Thus, in the case quoted above of a pilot flying to Dudley, near Birmingham, a red line across the map from Dudley to the margin would lead the pilot's eye from a very small-scale reproduction to an enlarged circle displaying the salient points of Dudley—a sort of marginal note to the objective.

Furthermore, if these marginal enlargements bore brief comments such as: red row of houses to north, Town Hall with green dome, football arena with "Players Please" on stand roof, these comments would assist the pilot in an immediate identification of his objective. There could never be any confusion due to Bradshaw-reading, and in congested areas each town could be given "a local habitation and a name."

It is only a matter of careful planning to make our present deceptive maps a real mine of information. Is it not worth the trouble to get the elusive B ensnared in this simple way?

SIR ERIC GEDDES

WITH great regret *Flight* records the death of the Right Hon. Sir Eric Geddes, G.C.B., G.B.E., Chairman of Imperial Airways, Ltd.

Sir Eric had a very full life, and his unusual abilities were manifested in a remarkable number of diverse appointments. Born in India in 1875, he was educated at the famous Edinburgh school, Merchiston Castle. In early life he spent some time lumbering in the Southern States of America, and then began his connection with transport, which became his greatest preoccupation in life, by securing a post on a railway in the U.S.A. From that post he returned to the country of his birth, and worked on a small but interesting railway line known as the Rohilkund Kumaon Railway, which was largely occupied in carrying passengers and goods to the foot of the Himalayas, whence they could climb by road up to the hill station of Naini Tal. Then he moved to the North-Eastern Railway in England.

When the Great War broke out, his transport experience and his great abilities brought him a number of high appointments which could hardly have been foreseen in his earlier days. His greatest work was to organise the transport in all the theatres of war. He was a member of the Imperial War Cabinet and also First Lord of the Admiralty. After the War he was made Chairman of the Committee which advised the Chancellor of the Exchequer on ways and means of reducing the swollen expenditure of the war years to normal proportions, and as a result of his exertions the expression "The Geddes Axe" came into popular use.

When Sir Samuel Hoare first became Air Minister, he decided that the only way to put British commercial flying on a satisfactory basis was to amalgamate the four flying companies which were then more or less in competition, and so to form Imperial Airways. The problem was to provide guidance which would ensure that the transport side and the business side of the new company were conducted on right and sound lines. There was plenty of expert aeronautical knowledge to be found in the four original companies, and what the new large combine needed was not knowledge of aeroplanes but knowledge of transport. There is no reason to suppose that at that time Sir Eric Geddes knew anything about aircraft, but he had shown great knowledge of transport and great ability in the conduct of business affairs, and so he was appointed the first Chairman of the new company. Some people felt at the time that air transport was only a small affair while Sir Eric Geddes was a very big man, and that the appointment was rather incongruous. But the authorities who chose him and persuaded him to accept the post have been proved to have chosen exceedingly well. Sir Eric Geddes has made Imperial Airways a very big and important concern in our national life and in the life of the Empire.

In the early days it must have been very hard to decide on the best policy for the new company. People in general did not want to fly, except as an occasional experience or adventure, as revenue there was nothing much except the Government subsidy, and the shares of the company were worth very little. Slowly but surely Sir Eric Geddes brought the company into a foremost place in the estimation of the country, of the world, and of the Stock Exchange. His policy was criticised now and then on one ground or another, but its ultimate success is his best vindication.

It is tragic that this wise guide should not have lived to see the new Empire air scheme in full working order and the transatlantic experiments leading the way, perhaps, to even greater developments in the field of aerial transportation.

PRIVATE FLYING

NOT SO PRIVATE: Child of a designer who, until comparatively recently, has concentrated on the production of private-owner types, the new Miles high-speed Service trainer has a number of features which would make it, in 200 h.p. form, an attractive device for the sporting pilot with (very) ample means.

Topics of the Day

Forecast

ONCE again I have found at least a prospective value in the regular weather reports which can be heard on about 1,180 metres from Borough Hill and in the use of a receiver in the ordinary light aeroplane.

Not so long ago I was firmly earthbound at a certain aerodrome by weather which was just aeronautically possible but by no means safe. Three other pilots had attempted to make progress in the direction in which I wished to go myself, but had returned with the same tale of woe, and I am not one to hazard the neck without good cause. Nevertheless, the terminal aerodrome appeared to be fairly clear and I discovered later that it would have been possible to get through by flying due south for a matter of fifteen minutes before setting a course for my destination.

Now the Air Ministry had persistently promised an improvement. This, however, never came in the particular area I had to cross by way of a start and I did not imagine that the improvement did actually apply—apart from the expected local thunderstorms—to the rest of the South of England. My objection was to a combination of poor visibility, torrential rain *and* thunderstorms. If I had had a radio set in the machine I could have sat up, listened to the various reports from different aerodromes and made for a fairly clear patch with an equally clear conscience.

Nobody minds flying through thick weather into known clear weather, but heaven preserve me from the awful business of pushing along over the tree-tops with neither hope nor faith to uphold me. In such matters I am proud of my cowardice and propose to go on being a coward. No see—no fly.

Combined Assistance

FOR the same reason I believe in the real usefulness of a turn indicator—with the ability to use it. If the worst comes to the worst one can always get out of a bad weather area with its aid and, if a radio receiver is also installed, one can dare to go up above the clouds and dead reckon one's way to an area with a high ceiling or no ceiling at all.

Cloud-flying without two-way radio is a bad thing, apart from the regulation breakage, since passenger machines may be doing the same thing in the same area, but a turn indicator and a receiver would be tremendously useful for emergency conditions, or for those conditions when the low-cloud layer is shallow enough to be negotiated with safety to all concerned. The great thing is to know the conditions at A or B *now*—and weather reports can be obtained twenty minutes after the observations have been made. Furthermore, the regular forecasts will at least give one an indication of the worst to be expected.

Sideslips Redivivus

WITH the steady increase in the number of flapped-low-wing monoplanes, the next generation of amateur pilots will probably never be taught how to sideslip. Such machines, if they can be sideslipped at all, do it, as a rule, very badly; in fact, the entire technique of flapped-low-wing approach is quite different and should not necessitate the use of such a manœuvre.

However, the many pilots who were brought up on training biplanes will never be able to forget their specialised approach methods, and I, for one, would still rather make a forced landing with a machine with a flat glide and a virile sideslip than I would with the more usual modern type. To me and to others who have been so trained, the steep or flat sideslip is carried out automatically, and one type is changed to the other, almost without thought, as the distance from the boundary is gauged by the eye.

For the present, I should certainly carry out a real forced landing approach on gliding turns only, leaving the flaps up until the machine was almost crossing the boundary with an adequate margin of height and speed.

Such opinions are, of course, retrograde in these days, but even the new generation will probably demand an instantaneously and safely adjustable air-brake system, whether consisting of trailing edge flaps or not. One day I should like to carry out some experiments to test the effect of flap-raising and lowering at low speeds, both at a safe height and in the hold-off attitude near the ground. Only so will it be possible to see when, and if, flap operations can safely be used to stretch or shorten an approach.

Display

EVERY Display visitor who flies himself, however sedately, must have been tremendously impressed by the sheer polish of the aerobatic flying, though we all wish that the organisers could think of something really new. Probationary Pilot Officer Peabody and his characteristic instructor performed exactly as they did last year, and I can't quite see why the show must necessarily end up with a series of loud bangs and much destruction.

The "radio play" in the set piece must have had mixed propaganda value, whether intended or otherwise. Everybody laughed when Carruthers (or was it Wilberforce?) said that he might look up the annihilated Port Hendon "if he had time"—a gracious act which should have repaid the remaining population for its many tribulations. And the futility of the war business was amply demonstrated when C. (or W.) attempted to cheer the survivors up with the news that we, in our turn, had blown an enemy factory to blazes—or further. Personally I should have been extremely cross with C. (or W.).

INDICATOR.

FROM the CLUBS and SCHOOLS

MIDLAND

DURING the week ended June 18 the Midland Aero Club put in 28 hr. 35 min. flying, including cross-country flights to Desford, Heston, Hornchurch, the Isle of Man, and Tollerton. Miss W. Bach made her first solo flight and Mr. Ingram has joined the Club.

YORKSHIRE

A very large number of cross-country flights were made in Yorkshire Aeroplane Club machines during the fortnight ended June 25 and a total of 155 hours were flown during the same period. Mr. Gould has gone solo, Mr. D. W. Stell has passed his "A" licence tests, and there are four new members, three of which have joined the Aviation Group.

SOUTH COAST

Just over a hundred hours' flying were put in by the South Coast Flying Club during the fortnight ended June 27. Mrs. Bellairs and Mr. Phillips made their first solo flights, while the former and Mr. Foord have carried out their "A" tests. Four new members have joined the Club. The Volunteer Reserve School will be starting at Shoreham very shortly.

REDHILL

The Volunteer Reserve School starts operations at Redhill on July 3. During the last fortnight a total of 145 hr. 15 min. flying have been put in by the Redhill Club. Mr. S. Davies has made his first solo, Mr. J. Harvey completed his "A" licence tests, and three new members have joined. The Fox Moth made two trips to the Continent during the first week.

YAPTON

Between June 12 and June 26 the flying times at Ford aerodrome totalled 91 hr. 20 min. First solos were made by Messrs. C. W. Parish, B. Arden, J. D. Walsh, J. Prentice, and "A" licence tests were passed by Messrs. O. Grugeon, R. Eborn, W. J. Crowsley, D. Block, E. F. Sall and J. Matthews. Of the eight new members three are taking the £15 "A" licence course.

WITNEY AND OXFORD

During the week ended June 19 flying time at Witney amounted to twenty-seven hours, of which twenty represented solo flying. Messrs. R. G. Secretan and P. W. M. Malorie have obtained their "A" licences and Mr. A. O. Cundy has obtained his "B." The new residential mess for the pupils of the Aeronautical College will be ready for occupation very soon and the premises will be officially opened on July 18, when a garden party will also be held.

SOUTHEND

Despite somewhat unsettled weather during the last fortnight the flying times have been excellent and last month's figure, which was itself a record, had been beaten before the 24th. Messrs. Walley and Shea made their first solos, the latter in the astonishingly short time of 3 hr. 50 min. dual in the Club Cadet. Messrs. R. Hadler, J. Walley, A. E. Falkus and E. Sarll passed their "A" licence tests. A dance was held in the clubhouse on June 19 and films of the Club's Coronation activities were shown.

SCOTTISH

The improved weather conditions experienced during the month of May were reflected in the Scottish Flying Club's time for the month, which was 361 hours, showing an increase of fifty hours over the figure for the same month last year. Twenty-eight pupils are under instruction and ten "A" licences have already been obtained during the year, while Miss Margaret Cunnison and Mr. J. A. Green have completed instructor's courses at Renfrew. The Club co-operated on Empire Air Day with the R.A.F. at Abbotsinch.

HANWORTH

The five first-soloists of the past fortnight include four members of the recently formed Midland Bank Flying Club; these are Messrs. Yeoman, Archer, Hidson, and Holloway. Mrs. B. Kirby-Green, Miss F. L. Planel and Messrs. Bevington, Hamment, James and Bingen have passed their "A" licence tests, the first-named making her first solo and carrying out her tests on the same day. Although two Moths were temporarily withdrawn for C. of A. overhaul, the flying time during the fortnight totalled 224 hr. 40 min.

BROOKLANDS

Club members have been going far afield during the last few weeks, flights being made to Budapest, Venice and Rome, while two other members made a tour of Germany, flying as far south as München. Next Sunday Mr. Arthur Woods is entertaining a large number of theatrical friends at a garden party which will precede the evening patrol—already dealt with in *Flight*. Incidentally, "attackers" on this occasion must approach between 1,000 and 2,000 ft. within a zone of five miles and one and a half miles' radius from the centre of the aerodrome; the patrol will be between 18.00 and 18.45 hrs. and every machine must make one left-hand circuit before landing. Seven new members joined the Club during the fortnight ended June 27, and Messrs. Drower, Boughton, Holdsworth and Leach made their first solo flights and Miss Sayer passed her "A" licence tests. The total flying time amounted to 239 hours.

EDINBURGH

Between May 23 and June 6 the Edinburgh Flying Club carried out 42 hr. 15 min. flying and two new pupils joined the Club. On Empire Air Day the Club flew two machines over to Turnhouse for joy-riding.

PORTSMOUTH

The monthly bridge drive held in the Club lounge on June 23 was a successful affair and the prizes were presented by the Club's directors. Another Moth Major, fitted with blind-flying equipment, has been added to the fleet. In the week ended June 24 flying times totalled 26 hr. 15 min. and new members were Messrs. P. G. Markham and R. W. Jones.

C.A.S.C.

On June 20 and 27 members flew a total of 21 hr. 45 min. at Cambridge. On the latter date two members flew to Leicester, where they took part in Army co-operation flying. At Gravesend 4 hr. 5 min. were flown on June 13. Members were given instruction in assembling a D.H. engine under the supervision of Mr. H. C. Brown, of Airworthiness, Ltd.

YORK AND LEEMING

Flying hours for last month up to June 19 totalled 190 hr. 20 min. During the last week of the period Messrs. Morrison, Oakland, and Barraclough obtained their "A" licences and Mr. J. H. Gladish renewed his. Mr. R. A. Marsh is now carrying on towards his "B." York aerodrome will be one of the official stopping places and controls for the Newcastle Race on Saturday.

LONDON

Between June 13 and June 25 six members—Messrs. A. P. Dixon, J. H. Kestin, O. Steenfelde, C. B. Lang, J. S. Lidstone and C. A. O. Key—made their first solo flights. The total flying time during the fortnight concerned was 301 hr. 45 min. In due course three of these soloists, Messrs. Kestin, Steenfelde and Key, completed the tests for their "A" licences. Four new members joined the Club.

LEICESTERSHIRE

On July 4 the Club is going to attempt to establish a flying-hour record by means of breakfast, lunch and evening patrols. The first will be to High Post and back via Southampton Water; the second will be to Woodford; and the third will be to Brooklands where a supper patrol is being held. On Sunday, July 18, pilots are invited to attack Leicester airport between 8.45 and 9.30 a.m. at a height of 1,000 to 2,000 ft. for the usual free breakfasts.

HERTS AND ESSEX

While three of the Club machines were being C. of A-ed the four remaining machines managed to put in 170 hr. 4 min. during the fortnight ended June 25. First solos were made by Messrs. Torra and Dalby, Mr. Worton completed his "A" tests, and Mr. Ferguson passed his passenger-carrying tests. Eight new members joined the Club, and Mr. B. B. Nicholson, a former pupil who obtained his "B" with the Club during last season, arrived in the Bombay Flying Club's B.A. Swallow.

CAMBRIDGE

During the fortnight ended June 27 the fleet of Marshall's Flying School put in 247 hr. 30 min. Messrs. Peirano, Beaumont-Thomas and Bunbury made their first solos, and of these Messrs. Peirano, Bunbury, and Beaumont-Thomas, with Miss Jones and Messrs. Lindsell and MacCaw, completed their "A" licence tests. Cross-country flights were made, among others, to Shrewsbury, Norwich and Yorkshire, while the Monospar was flown to Bognor and did a certain amount of night flying.

KARACHI

During May thirteen members were training for their "A" licences and eleven for their "B" licences, while ten others were taking G.E.'s training. A total of 260 hours was flown by Club machines, of which 160 represented solo flying. Capt. Salmon and Messrs. Mendies, Patel, Cabaral, Irani, Porteous and Pollard made their first solos and Mr. A. N. Modak obtained his "A" licence. During the month the Club lost its assistant instructor, Mr. G. B. Gadgil, who has left to take up an appointment at Tatas, and Mr. N. R. Gogte has taken his place.

CINQUE PORTS

Four new members joined the Club during the last fortnight, in which 125 hours were flown. Members were interested to see six Gladiators belonging to the Belgian Air Force which cleared Customs at Lympne on their delivery flight. Among other visitors was Mr. A. E. Clouston, who arrived in a Westland Wallace equipped with a very loud siren for sound-detector experiments over Hythe. Mr. L. C. Hilditch, who obtained his "B" licence at the Club, has obtained a post as instructor at West Malling. On Monday and Tuesday of last week about twelve machines came in from various parts of the country for the Folkestone race-meeting. Preparations for quite a different kind of race, the Folkestone Aero Trophy, which is to be held on July 31 over the same course as last year, are going ahead rapidly. Members are becoming very keen on formation flying and the Club can now produce a flight of five machines in really quite close and presentable formation.

Private Flying

JOHANNESBURG

A number of interesting competitions were held at Baragwanath during May, for which the flying total was 510 hours. The landing competition on May 9 was run in two sections, Mr. Dunn winning the first and Mr. Morton winning the second. Mr. Dunn also won the bombing competition on May 17 and Mr. Grafton won the balloon-bursting competition on June 23. The Durban Air pageant will be held on July 22, 23 and 24.

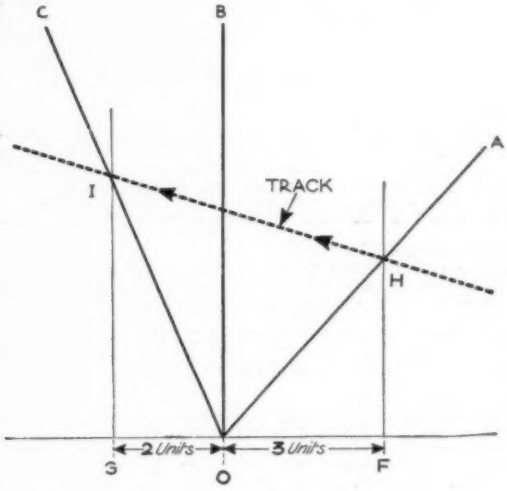
BENGAL

During the month of May the Bengal Club's Moth VT-AGH flew more than 73 hours, including a charter flight to Dacca. Mr. J. A. Mathai passed the blind flying test for his "B" licence, Mr. A. C. Baxter qualified for "A" licence renewal, and three new members started dual. A Coronation flying gymkhana, which was held on May 15, was well attended, but some of the competitions had to be cancelled because the air on that day was excessively bumpy.

RUNNING FIX

Another Method of Plotting One's Track from the Usual Three Bearings

FROM time to time *Flight* has been publishing new solutions to certain simple problems faced by the charter pilot or the navigation examinee. This article explains a new method, developed by a reader, of plotting one's track from three bearings taken on a single object—whether by bearing compass or D/F—at known time intervals. In some respects, at least, this method is an improvement on the normal one by which the time intervals are marked either on a ruler or along the edge of a piece of paper, which is slid along the bearings until the markings cut all three bearings. Either system is still largely of academic interest since the problem is usually solved in the air by means of a C.D.C., but the use of larger machines for transport operation now makes it possible for the pilots to have the use of a chart table.



The sequence of operations for the construction of the necessary diagram is as follows:—

1. Convert the bearings to true and plot them *from* the object or W/T station. 2. Draw a line of any length through the object, this line being perpendicular (i.e., at right angles) to the second or middle bearing. 3. Along this line mark off, to any convenient scale or unit, on either side of the object; the relative time intervals between 1st and 2nd, and between 2nd and 3rd bearings. Such time interval measurements must, of course, be made to the side appropriate to the bearings as taken. 4. From the time-interval points drop perpendiculars to cut the respective bearings. 5. Join these intersections and obtain the track.

Here is an example of such a problem followed by a solution which can be understood by means of the accompanying diagram.

Example: At 09.10 hours the bearing of an aircraft from a W/T station is 61 deg. true; at 09.40 hours the bearing is 18 deg. true, and at 10.00 hours the bearing is 355 deg. true. What is the track of the aircraft?

The interval between 1st and 2nd bearing is 30 min.; that between the 2nd and 3rd bearing is 20 min. The time ratio between the 1st and 2nd, and 2nd and 3rd bearings is, therefore, as 3 is to 2. Thus, three units must be marked off towards the side on which the 1st bearing lies, and two units towards the side on which the 3rd bearing lies.

(1) From position O plot the bearings OA, OB and OC. (2) Draw GF perpendicular to OB. (3) Plot position F three units from O. (4) Plot position G two units from O. (5) From points F and G, respectively, drop perpendiculars to cut 1st and 3rd bearings respectively at H and I. (6) Join H to I and obtain track, which is 306 deg. true.

The R.A.F.F.C. at Play

ON Saturday, by way of an experiment, the Royal Air Force Flying Club held an informal dinner-dance at Hatfield, using the London Club's hangar as a banqueting hall and the restaurant as a ballroom. There must have been nearly two hundred members and guests present, so the experiment, if such it was, can be considered as a pronounced success. Dancing continued until midnight.

Ninety-fourth

LAST week the D.H.94, a two-seater low-wing monoplane, made its first test flight in the hands of its designer, Capt. G. de Havilland himself. This machine, as some readers will know, has been built in order that full-scale tests on certain interesting structural and other features may be carried out. It is fitted with a 75 h.p. Gipsy Minor—a unit which was originally developed five years ago, and of which we may eventually see more.

The Beauvais Accident

IT is not usual for *Flight* to describe accidents unless these are of a catastrophic nature or unless some very immediate lesson can be learnt. The considered report of the Accidents Branch of the Air Ministry is, instead, published in due course.

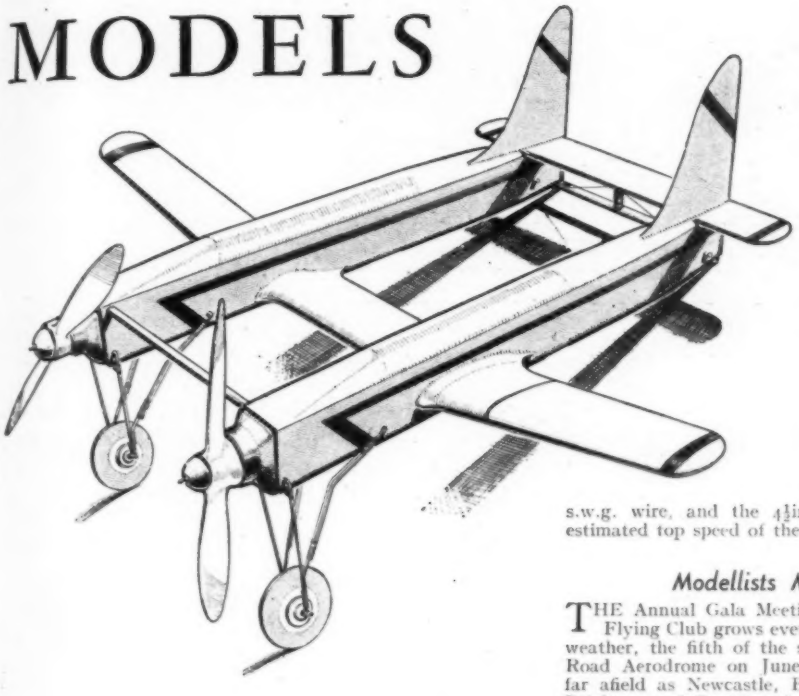
Unfortunately, an aeroplane accident is "news" within the Press meaning of the word, and due prominence was given last week to the accident, involving the lives of two Guards officers, near Beauvais. More unfortunately, a number of papers, depending on very local evidence, explained the accident by saying that the Whitney Straight machine concerned actually broke in the air. Immediately the news came through at Reading, Wing Cdr. Stent flew over with the Phillips and Powis company's best ground engineer to examine the wreckage and attend the French enquiry.

It was found that there was no question of structural failure; the machine dived out of a storm cloud with a base at about 1,000ft. and finally struck the ground in a spiral. Part of an aileron was found a little way from the wreck and it is possible that this broke away before the impact as a result of the pilot's desperate last-minute attempt to pull the machine out of the dive. Visibility generally was not too good at the time and it is quite possible that the pilot had no idea of the attitude of the machine until the very last moment. It does not, after all, take more than a very few seconds for a machine to lose 1,000ft. when it is actually diving at or beyond the vertical.

A Leicester Patrol

ON July 18, between 8.45 and 9.30 a.m., pilots are invited to "attack" Leicester aerodrome. The area patrolled by the Leicestershire Aero Club will be a ring with its centre three-quarters of a mile from the aerodrome and its perimeter five miles from it. Visiting pilots flying below 1,000 ft. or above 2,000 ft. in this defended zone will be disqualified. The usual free breakfasts are provided for those who are not spotted on their way in.

MODELS



Nearly 50 m.p.h.! Extraordinary Power from Rubber : Enthusiasts in Force at Heathrow

By M. R. KNIGHT

Hustle at Hurlingham

A MODEL covered the 150ft. Hurlingham course at no less than 46.48 m.p.h. to win the *Flight* Trophy in the S.M.A.E. Speed Contest on May 30th. The entrant was Mr. R. L. Rogers (Northern Heights M.F.C.), with the twin-fuselage low-wing model *Mercury*. Though handicapped by a following breeze, it took off some yards before the starting-line and covered the final 10-15 yards by sheer velocity, the power having run out!

This year use was made of a new system of timing devised by Mr. I. G. Brown, of T.M.A.C. A stop-watch, held in relay, was started electrically by an observer on the starting line as each model crossed, and was stopped by an observer on the finishing-line pressing a switch. This arrangement proved vastly superior to the flag-wagging formerly in vogue.

Mr. R. J. Linfoot achieved 26 m.p.h. with an elegant mid-wing monoplane having slight taper and a circular-section fuselage composed of longerons and stringers with the interstices filled with balsa sheet. Mr. W. Worden (T.M.A.C.) reached over 20 m.p.h. with *Zephyr*, a cantilever high-wing model. Last year's winner, Mr. H. E. White, was put out of the running by a damaged wing-stub.

The Rogers Racer "Mercury"

MR. ROGERS has been working on the twin-fuselage type of machine since 1933, when, as a spectator, he noticed the great difficulty experienced in holding a straight course with a single airscrew, on account of the terrific torque. His model has, in recent years, been held back by the stripping of gears, loosening of shafts and similar troubles resulting from the high power employed. This year steel gears and keyed shafts have brought success.

Mercury weighs no less than 75 oz., and with a wing area of 168 sq. in., has a loading of 64 oz./sq. ft.! The span is 3ft. 9in., and the overall length 3ft. Dealing first with the wings, the central panel between the fuselage has a constant chord of 4½in. while the outer panels taper from 4½in. to 3in. These panels have stout balsa stubs which plug into sockets in the fuselage sides, enabling them to tumble out in the event of a crash. The structure consists of spruce spars and stout balsa ribs, with 1 mm. three-ply covering and a final covering of silk, doped and painted. The flat tail-plane and the two fins are of spruce and balsa, covered with doped and painted paper.

Each fuselage has four longerons of 3/16in. by 3/16in. spruce, filled in with ⅛in. balsa sheet. Top and bottom surfaces are rounded off with thin balsa sheet, and the latter is provided with celluloid inspection panels for the condition of the rubber installation to be checked. The motor in each fuselage weighs 15 oz., and consists of five strands of thin ¼in. rubber strip, four being grouped in square formation, with the central gear driving the airscrew. The latter is carved from birch and is 12in. in diameter, and in effective pitch. The airscrews turn at 4,000 r.p.m. for 3½ sec., giving 1 h.p. each. The vee-type undercarriages are of 12 s.w.g. wire, and the 4½in. wheels of ¼in. three-ply. The estimated top speed of the model is 48 m.p.h.

Modellists Muster at Heathrow

THE Annual Gala Meeting of the Northern Heights Model Flying Club grows ever more popular. Despite threatening weather, the fifth of the series, held at Fairey's Great West Road Aerodrome on June 20, attracted enthusiasts from as far afield as Newcastle, Birmingham, Banbury, Herne Bay, Brighton and Portsmouth. Thirty came from the Rochester Works of Short Bros., and there was even one Frenchman, incidentally flying a model of Mr. Judge's 1936 Wakefield Cup winner. There were some 150 cars parked on the field.

Ten contests were held, one for "ladies only" attracting fourteen entries and being won by Mrs. Worley (Northern Heights). The *Flight* Annual Challenge Trophy was awarded in a contest for flying scale models, in which the wings were required to be in the true scale position (a point where modellists all too frequently claim the aeronautical equivalent of poet's licence!) and in which marks were awarded for flying, construction, faithfulness to type, etc. Mr. W. L. Henery (T.M.A.C.) repeated his victory of last year with the same large Leopard Moth described and illustrated in *Flight* of July 2nd, 1936. The two runner-up, Messrs. Gillett and Crow, also flew Leopard Moths.

The Coronation Cup was commendably awarded for the best modern free-lance "semi-scale" type of model. It was won by Mr. C. Rupert Moore with the excellent *Viper* shoulder-wing intercepter, described in *Flight* of March 4 last. A *concours d'élégance* attracted some uncommonly interesting models, including Mr. Trevithick's 3ft. span parasol (unfinished) with the 1.75 c.c. two-stroke referred to last month and a 10ft. span Mew Gull with Grayspec two-stroke. The *Model Engineer* Cup was awarded to Mr. H. L. Sharvell, whose straight-chord parasol with monocoque fuselage, and powered by a 6 c.c. Loutrel two-stroke, flew very successfully. In other categories prizes went to Mr. Sharvell for a smaller parasol with 1.5 c.c. two-stroke designed by himself, Mr. C. A. Rippon for a Carden-Baynes Bee type fuselage model with twin pusher airscrews (unfinished), Mr. Rogers for his racer *Mercury*, and Mr. H. J. Towner (Brighton) for a beautiful white tapered-wing Hornet Moth—based on drawings of the machine in *Flight*—with which very fine flights were obtained.

A seaplane contest was held from T.M.A.C.'s launching-tank, now lengthened, widened and deepened. Mr. J. Worden's model clocked 89 sec., won the contests, and disappeared! The prizes were distributed by Mrs. Thurston, supported by Dr. Thurston.

Among the models successfully demonstrated were several petrol craft, including Capt. Bowden's monocoque, described last month, four biplanes (rubber driven), and Mr. H. E. White's large flying-boat *Ganda*, with rubber motors in nacelles under the wings. This machine made a most impressive flight, hand-launched, of over 30 seconds. Altogether a most interesting and instructive occasion, on which Mr. Rippon and the Northern Heights Club are to be congratulated.

* * *

For the fifth year, Mr. J. C. Smith's "circus" has given a display at the invitation of the Hurlingham Club.

Seaplane-tank operation, aerobatics (intentional!), parachute releasing, and catapulting a glider were included in the programme, which was accompanied by microphone commentary.

* * *

The S.M.A.E. has instituted a record category for gliders catapulted from level ground, and has made a first award to Mr. C. S. Rushbrooke (Lancs M.A.S.) for a flight of 2 min. 25 sec.

* * *

Eliminating trials for the choosing of the British Wakefield team will be held at Fairey's Aerodrome on July 18, and the contest itself at the same venue on August 1.

Two contests for petrol models, for the Sir John Shelley Cup and the Bowden International Trophy, will be held by the S.M.A.E. at Fairey's Aerodrome on August 2.

* * *

I have received the catalogue of Kango Aero Models, 1, Colonnade Passage, New Street, Birmingham, a concern run by enthusiasts with pre-war experience. Petrol model constructors are specially catered for, and the latest designs, including the record-holding Comet II, are available in the form of kits. Rubber-driven types include the *Dragonfly*, a very pleasing straight-chord, staggering biplane, which has flown for 105 sec. There are also the usual materials and accessories.

THE INDUSTRY

Aluminium Welding

THE second of the new series of technical information booklets published by the British Oxygen Co., Ltd., Thames House, London, S.W.1, deals with aluminium welding.

Callender Hangars

AN interesting departure by Callenders Cable and Construction Co. was reported at the firm's annual general meeting held recently. A special form of light, semi-portable aircraft hangar has been designed for the Air Ministry, and seven had been erected in different parts of the country.

H. M. Hobson's Dividend

IT is announced that the directors of H. M. Hobson (Aircraft and Motor) Components, Ltd., have declared an interim dividend of 5 per cent. actual, less tax, on the year ending September 30, 1937, and payable on July 10 to all shareholders on the register at June 26, 1937.

Mr. C. T. Delaney

THE marriage took place on June 12 of Mr. C. T. Delaney to Miss Yvonne Mayers. Mr. Delaney, who is a director of Gallay, Ltd. (who are now principally engaged on aircraft work), has designed a number of components, such as radiators, oil coolers, and cabin heaters, which are now being fitted to Service aircraft

Hillson Plywood

AT the annual general meeting of F. Hills and Son, of Manchester and Stockton-on-Tees, it was reported that their aircraft plywood factory has now commenced operations, and it was stated that this is the first in the British Isles to produce aeronautical plywood through all its stages from the log. Air Ministry approval had been obtained, and plywood could now be supplied to any aircraft constructor.

A Tecalemit Appointment

IT is announced that Mr. F. R. Stanley, of Tecalemit, Ltd., has recently been appointed aviation manager to deal with the Company's rapidly increasing interests in this field. At the moment he is busily engaged with applications regarding the new Tecalemit high-pressure pump and hydraulic motor.

Mr. Stanley has just completed his tenth year with the Company, during which time he has been employed as engineer in liaison with various vehicle and aircraft manufacturing concerns.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(Published June 17, 1937.)

31665. VICKERS (AVIATION), LTD., and EASTES, J. C.: Valves for high-pressure hydraulic transmission (465,880).
31675. BENDIX AVIATION CORPORATION: Indicating instruments particularly for aircraft (465,882).
31790. VICKERS (AVIATION), LTD., PIERSON, R.K., and FIRMAN, R.A.: Aircraft controls (465,891).
31879. BENDIX AVIATION CORPORATION: Wheels for aircraft (466,167).
33758. FAIREY AVIATION CO., LTD., LOBELLE, M.J.O., and VOSS, E.: Means for moving one body relatively to another (465,832).
36115. DE HAVILLAND AIRCRAFT CO. LTD., KELLY, C. H., and GROOMBRIDGE, A.T.S.; Manufacture of welded tubes and the like, and welding apparatus therefor (465,904).
32551. ROUSSELOT (nee TRICAU), M.: Parachutes (466,089).

(Published June 24, 1937.)

33012. BOWIE, J. W.: Fasteners, particularly for safety belts for use on aircraft (446,501).
33148. ECLIPSE AVIATION CORPORATION: Means for distributing fluid (466,572).
34492. FAIREY AVIATION CO., LTD., HALL, G. W., and LEBELLE, M. J. O.: Controlling oil-cooling on the internal combustion engines of aircraft, land and marine vehicles (466,286).
2736. SOC. D'INVENTIONS AERONAUTIQUES ET MECANIQUES S.I.A.M.: Pneumatic means for controlling the firing, reloading, and safety blocking of automatic guns.
20021. CROSSLEY-PREMIER ENGINES, LTD., and YEATES, A. C.: Engine supercharging apparatus (466, 383).
27870. POTEZ, H. C. A.: Devices for operating the control surfaces of flying machines (466,462).
27883. JUNKERS & CO., GES.: Control devices for liquid-heaters (466,328).
31778. BOULTON PAUL AIRCRAFT, LTD., and CLARKE, W. H. V.: Means for preventing the entry of air into the fuel pipes of aircraft (466,335).

(Published July 1, 1937.)

28900. GRAVINER MANUFACTURING CO., LTD., and SALMOND, H. M.: Method and apparatus for preventing and extinguishing flame (466,589).
33307. PAULSSEN, O.: Roofs and roof-protecting devices for sheds, hangars, or the like (466,716).
33338. MARTIN, J.: Arrangement and construction of rudder and tail-plane unit of aeroplanes or other aircraft (466,664).
33342. NAPIER & SON, LTD., D., and TRYON, H. C.: Packing rings for pistons and the like (466,718).
33507. BAYNES, L. E., and ABBOTT, LTD., E. D.: Construction of aircraft wings (466,665).
33735. HAMILTON MOTORS (LONDON), LTD., and THEED, W. D. L.: Control of wing flaps on aircraft (466,800).
9578. BOULTON PAUL AIRCRAFT, LTD., and SAYERS, W. H.: Rotary fluid-flow meter (466,628).
1038. SPERRY GYROSCOPE CO., INC.; Magnetic compasses (466,865).
33611. SPERRY GYROSCOPE CO., INC.: Gyro-magnetic compasses (466,864).

SEEING WHERE THEIR HANDIWORK GOES

The office and works personnel of Simmonds Aerocessories Ltd., travelled *en masse* to the Hendon Display on Saturday as the guests of Mr. and Mrs. O. E. Simmonds. Many of them must have thought, as they watched the evolutions of modern Service aircraft, "*I* helped to make that possible."